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ABSTRACT

The value of satellite videoconferencing in providing a new mechanism for informed dialogue between congressmen and constituents is evaluated through actual demonstrations. The experimental demonstrations described include large and small group congressional-constituent meetings in urban and rural areas, and a congressional subcommittee hearing with witnesses at field locations. Also examined are public policy implications, including options for an operational system and cost-effectiveness of congressional videoconferencing, and its potential role in the National Energy Program during the second year of the project. The foreword includes comments by 14 participating U.S. Senators and Representatives. (CMV)

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VIDEOCONFERENCING VIA SATELLITE:
OPENING CONGRESS TO THE PEOPLE

ED162646

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TECHNICAL REPORT

Prepared by the

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TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC) AND USERS OF THE ERIC SYSTEM."

February 1978

IR006620

ABSTRACT

The purpose of this action research was to evaluate--through actual demonstrations--whether satellite videoconferencing can provide a new mechanism for informed dialogue between congressmen and constituents and as a result strengthen the legislative process.

What is satellite videoconferencing? (pp. 5-29) Two-way interactive television with the TV signals transmitted by satellite. With videoconferencing, one or more congressmen in Washington, D.C. can see and hear and talk with groups of citizens at distant locations around the country. Simultaneously, the citizens can see and hear and talk with the congressmen.

Does satellite videoconferencing work? (pp. 5-29) Yes. This experiment proved that videoconferencing is technically feasible. Four demonstrations were successfully completed: Q&A session between Rep. Charlie Rose and high school students in Raeford, N.C.; meeting between Rose and local public officials; hearing of the Senate Subcommittee on Science, Technology & Space (Senators Stevenson, Schmitt, Goldwater, Pearson) with public witnesses in Springfield, Ill.; and meeting between Rep. Pete McCloskey and constituents in California.

Are videoconferences useful? (pp. 31-38; also 5-29) Yes. Participants in the four demonstrations found that satellite videoconferencing helps congressmen reach more people more effectively, increases citizen participation and feedback, saves time and energy of congressmen and constituents, and stimulates citizen interest in and understanding of the legislative process.

What will videoconferences cost? (pp. 53-58) About $300/hour in the 1980-1982 time frame for simple applications. For a typical congressional subcommittee or committee hearing, videoconferencing would be about three times cheaper than the cost of airfare, travel time, and per diem for the witnesses. The benefit/cost ratio of videoconferencing is about 3:1, and this does not include the subjective value placed on participation of citizens who would not otherwise have the time or money to come to Washington, D.C.

When will satellite videoconferencing be widely available? (pp. 39-52) 1980-1982, if Congress takes action now to ensure that public and congressional needs for videoconferencing are met. Of critical importance is the requirement for low-cost, small earth terminals which can be located on or near public buildings throughout the country and for mobile terminals which can be located in small towns and rural areas which do not need permanent facilities.

What should Congress do to ensure an operational videoconferencing system by 1980-1982? (pp. 61) Redirect U.S. preparation for WARC, request assessments by OTA and Commerce Department, conduct full hearings (e.g., by Communications and Science and Technology Subcommittees), consider need for legislation and administrative and/or regulatory actions.

What should Congress do in the interim? (pp. 63-65) Assign overall responsibility for congressional applications to appropriate committees (e.g., Senate Rules and Administration, House Administration, House Rules), authorize comprehensive demand/cost analysis, move ahead with applications using existing commercial, NASA, Bell/AT&T, cable TV, and Public Broadcasting satellite systems. Explore possible multipurpose use of satellite systems for voice, data, graphics, and slow-scan videoconferencing in addition to full two-way video. Explore possible satellite transmission of floor/committee proceedings and legislative information to Public TV stations, public schools and libraries, and the like.

What about videoconferencing on energy? (pp. 67-77) The full potential of videoconferencing is in facilitating public dialogue and involvement on issues such as energy which are so complex and difficult that traditional means of communication do not suffice. All four of the demonstrations in some way addressed the subject of energy. The results indicated that videoconferencing can facilitate dialogue on energy between congressmen and a broad spectrum of the public, from high school students to local public officials to university professors to subject-matter experts.

Videoconferencing: opening Congress to the people. (pp. 79-86) Satellite videoconferencing should be used by the Congress to facilitate broad public participation--experts and laypersons alike--in key aspects of the national energy program, such as barriers and incentives to implementation of renewable energy options.

Videoconferencing and its complement, computer-conferencing, could be used for:

- Distribution of legislative information package on renewable energy to public libraries and schools.
- Conduct of congressional committee or subcommittee staff-level meetings with public participants at distant locations.
- Conduct of committee or subcommittee hearings/meetings with testimony from public witnesses via satellite.
- Transmission of congressional committee hearings to distant locations around the country.

Videoconferencing: an energy-conserving and democratic technology. (pp. 86-87) Use of videoconferencing will help to open up the legislative process to people who do not have the time or money or physical strength to travel to Washington, D.C., and will also help conserve the time and energy of the congressmen themselves. Thus videoconferencing is democratic, by virtue of its two-way participative nature, as well as energy-conserving in its own right.

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DEDICATION

This report is dedicated to two members of the U.S. Senate who over the years have been leaders in working for an open Congress and the use of modern communication methods in bringing Congress closer to the people.

Hubert H. Humphrey (1911-1978)

"Any nation is in trouble when its citizenry feels alienated from its government and suspicious of it; but this is by far a worse disease when it afflicts a democracy.

"There are some justifications for this lack of esteem for public officials. . . But one of the reasons is popular ignorance of what government is and how it functions. That condition as a basis of the public's judgment of us is not acceptable, and its results are not justified. We must act to overcome it, to the extent we are able.

"I believe that the measures I have proposed (such as opening the Senate and House floors to radio and TV coverage, opening committee and subcommittee activities to news media coverage, use of a modern information and communications system within Congress to assist members in performing their work) would go far toward fulfilling our duty.

"I believe that an open Congress would be a Congress understood and respected."

- February 20, 1974

Hubert H Humphrey

Lee Metcalf (1911-1978)

"For too many years the Federal government has been seen to be remote, unresponsive, insulated and untrustworthy. All of us sense the feeling of distrust whenever we are able to return to our home states, visits which have become more and more infrequent over the years as congressional sessions have steadily lengthened and the workload has continued to expand.

"In these circumstances, there are compelling reasons for us to be looking for new ways of relating the work of the Congress to the people, for bringing more citizens into our hearings as participants, for listening to voices other than those of the professional witnesses we tend to hear year after year in the development of legislation.

"I believe these experimental demonstrations of congressional video-conferencing open the prospect for a new era in representative democracy. I hope all Senators and Representatives and the public at large will consider the implications of this important experiment and encourage further exploration of methods of improving the exchange of information and ideas between the U.S. Congress and the American people whom it serves."

- June 10, 1977

Lee Metcalf

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United States Senate
COMMITTEE ON COMMERCE, SCIENCE,
AND TRANSPORTATION
WASHINGTON, D.C. 20510

February 6, 1978

Mr. Fred B. Wood
Project Director, Congressional
Videoconferencing Project
Program of Policy Studies in Science
and Technology
The George Washington University
Washington, D.C. 20052

Dear Mr. Wood:

I appreciate receiving a copy of the report on Congressional Videoconferencing. The hearing held by this Subcommittee using the Communications Technology Satellite demonstrated the future utility of this system. There is no question that an operational public service satellite communications system would extend the reach of Congress and other governmental bodies in many useful ways. Hearings, question and answer sessions, and news conferences would be routine applications of this technology.

The Subcommittee very much appreciates your support in conducting this interesting and worthwhile experiment in governmental communications.

Best wishes.

Sincerely,

Adlai E Stevenson

ADLAI E. STEVENSON, Chairman
Subcommittee on Science, Technology
and Space

United States Senate

COMMITTEE ON COMMERCE, SCIENCE,
AND TRANSPORTATION
WASHINGTON, D.C. 20510

"On Wednesday [June 8, 1977] the Subcommittee on Science, Technology and Space conducted a legislative hearing by means of the Communications Technology Satellite (CTS), the public service communications research satellite operated jointly by the United States and Canada. . . The witnesses who testified on S. 421, a bill to establish a national climate program, were located in the Federal courthouse in Springfield, Ill. They communicated with the subcommittee members in the Dirksen Office Building through a two-way video and audio [satellite television] circuit.

"I can report that the experiment was successful. The subcommittee received testimony on climate and weather from three panels of witnesses. We were able to question the witnesses without difficulty. A useful hearing record was compiled on this important subject.

"Congress has needlessly lagged behind in adopting its procedures and facilities to the existing communications technology. As our experiment on Wednesday demonstrated, there will soon be additional opportunities for increasing public involvement in the work of Congress through the application of public service communications. We should be ready to use this technology in a responsible manner."

- Sen. Adlai E. Stevenson, Chairman
  Subcommittee on Science, Technology and Space
  June 10, 1977

"Mr. Chairman, I think it has been an extremely interesting and exciting morning, and certainly one that encourages me to think that these hearings [have been] very profitable and also very educational, not only for us, but to the people [in Springfield, Ill.] that have had the opportunity to join us [via satellite]."

- Sen. Harrison H. Schmitt, Ranking Minority Member
  Subcommittee on Science, Technology and Space
  June 8, 1977

"I think I took part [several years ago] in one of the first trans-Atlantic debates via satellite. Our Secretary of State and I debated the Foreign Ministers of England and France. . . And as you know, we used this [satellite] on an Indian reservation in Arizona very successfully, and I am a great believer in what you're doing. . . So there is no question in my mind that this [use of satellite for climate and weather-related activities] offers probably the greatest step forward. We just have to get behind it and make it work."

- Sen. Barry Goldwater, Member
  Subcommittee on Science, Technology and Space
  June 8, 1977

ALAN CRANSTON
CALIFORNIA

United States Senate

WASHINGTON, D.C. 20510

March 3, 1978

Mr. Fred B. Wood
Program of Policy Studies
in Science and Technology
George Washington University
Washington, D.C. 20052

Dear Mr. Wood,

Many thanks for the opportunity to comment on the congressional videoconferencing project.

Videoconferencing adds a dimension of value both to the public and to members of Congress. It's a flexible medium which can go a long way toward opening public communications. It can reach into distant cities, small towns, and rural areas. It can overcome obstacles for the poor and the elderly. Its potential for complementing the legislative process is readily apparent.

Clearly, congressional and public interests coincide when time and money are saved, when the fatigue of travel is eliminated, and when greater numbers of people gain access to their elected representatives.

There is, of course, no substitute for direct contact. Observations at close range, informal comments, or even a handshake will often yield understandings which otherwise might not have been reached. But when hearings cannot be held in the field, or when witnesses cannot be in Washington to testify, there is a need which telecommunications can satisfy.

Thanks again for bringing your work to my attention.

With best wishes to you and the members of the George Washington University Project Team,

Sincerely,

Alan Cranston

Alan Cranston

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United States Senate
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WASHINGTON, D.C. 20510

February 10, 1978

Mr. Fred B. Wood
Project Director and
Research Scientist
Program of Policy Studies in
Science and Technology
The George Washington University
Washington, D. C. 20052

Dear Mr. Wood:

Thank you very much for your recent letter. I appreciate your courtesy in providing me with a copy of the report on the Videoconferencing Project.

As a representative from the State, which is several thousand miles from Washington, any effort which results in increased participation by the citizens of remote areas in their government interests me greatly. As you may know, Alaska has one of the most developed systems of small satellite earth stations in the country. I think the Videoconferencing Project could be easily adapted to use in Alaska and would be a significant improvement in communicating with our constituents. The actions of the Congress are of great importance to Alaska. I am hopeful that your report will result in increased support for videoconferencing efforts.

Please keep me informed of your efforts.

With best wishes,

Cordially,

Ted Stevens

TED STEVENS
United States Senator

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7TH DISTRICT, NORTH CAROLINA

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CHAIRMAN, AD HOC COMMITTEE ON COMPUTERS

Congress of the United States

House of Representatives

Washington, D.C. 20515

February 6, 1978

Dr. Fred B. Wood
Project Director
Program of Policy Studies
in Science and Technology
The George Washington University
Washington, D.C. 20052

Dear Dr. Wood:

Videoconferencing by satellite opens up a whole new vista for congressional communications. We get letters from constituents and we send out newsletters and statements via press and radio-television, expressing our views. But communication between the congressmen and his constituent must be a two-way street. The immediacy of this medium permits such a dialogue to take place in an atmosphere second only to face-to-face meetings.

The memorable morning I spent at NASA talking with students and county officials in Hoke County convinced me of the great potential for this medium of communication. Committee hearings, "town meetings", press conferences, meetings with constitutents and dozens of other congressional activities could take advantage of this space-age technology in a way that would increase the efficiency of the Congress and the legislative products we produce.

Thank you for letting me be a part of this exciting project.

With best wishes,

Sincerely,

Charlie Rose

PAUL N. McCLOSKEY, JR.
12TH DISTRICT, CALIFORNIA

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February 3, 1978

Dr. Fred B. Wood
Project Director and Research Scientist
The George Washington University
Program of Policy Studies in
Science and Technology
Washington, D. C. 20052

Dear Dr. Wood:

I was tremendously pleased with the July 16, 1977, video-conference with the psychologists from my district in California. To me the major advantages are three-fold. From my standpoint, the videoconference was as productive as a face-to-face conversation would have been. In fact, it was a face-to-face meeting.

Also, the procedure saves an immense amount of time, in that the time is clearly limited and the parties on both sides must exercise a restraint on excessive rhetoric in order to get their points across. I think the self-discipline this required is helpful. Finally, I had a chance to meet with a constituent group which might otherwise never have been able to work into a district schedule which never permits enough time to handle all those who wish to reach their Congressman for a few minutes quiet and serious conversation. By using time during the less hectic evening hours in Washington (7-8 p.m., Eastern Daylight Time), I was able to accommodate the psychologists during their working hours (4-5 p.m., Pacific Daylight Time).

The GWU report provides a useful summary of the videoconference demonstrations, and comes to a conclusion which I wholeheartedly support: Congressional videoconferencing is an innovation whose time has come. By facilitating an open and honest dialogue between citizens and their Representatives in U.S. Congress, there is no question in my mind that videoconferencing can strengthen the legislative process and encourage informed advocacy by individuals and groups whose own time and effort schedules would make such advocacy difficult.

I have appreciated the opportunity to participate in your experiment and urge my colleagues to give this report the careful reading it deserves.

Sincerely,

Paul N. McCloskey, Jr.

PNMcC:pp

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COMMITTEE ON
VETERANS' AFFAIRS

February 9, 1978

Dr. Fred Wood
George Washington University
Program of Policy Studies in
Science and Technology
Washington, D.C. 20052

Dear Dr. Wood:

Thank you for giving me the opportunity to comment on your very innovative project utilizing NASA satellites to transmit videoconferences between Members of Congress and constituents in their districts.

Videoconferencing is an exciting new project with excellent opportunities for helping to meet the needs of constituents and help with Congressional research projects.

I realize that district locales for constituent participation are somewhat limited in some parts of the country right now, but I'm encouraged that as the videoconferencing project moves towards realizing its full potential, the concept will become widely familiar and used.

It could be an excellent means for meeting with representatives of groups or cross-sections of the community and could only benefit both parties.

I am looking forward to participating more fully in the project. From all I've heard and read, it's a very worthwhile idea and you are to be fully commended for your dedicated efforts in its behalf.

Sincerely,

Don Edwards

Member of Congress

DE:sf

JOSEPH L. FISHER
10TH DISTRICT, VIRGINIA

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COMMITTEE ON THE
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JOHN G. MILLIKEN
EXECUTIVE ASSISTANT

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February 6, 1978

Mr. Fred B. Wood
Program of Policy Studies in
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The George Washington Univ.
Washington, D.C. 20052

Dear Fred:

I read the draft report on the congressional videoconferencing project with much interest. I believe it could be a useful means for Members of Congress to increase the dialogue with those they represent.

I have the advantage of representing a congressional District adjacent to the Nation's Capital. My communication with constituents is a constant part of my daily congressional duties. I believe I benefit from that and that the general attitude toward government measured by its accesibility and responsiveness is enhanced. Videoconferencing seems to me to be one way for others to have some of those same advantages. People in general are concerned about their government and anxious to participate in it. Your project seems to provide one means for doing so.

I wish you all the best.

Sincerely,

Joseph L. Fisher
Member of Congress

JLF: jgms

NINETY-FIFTH CONGRESS

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Congress of the United States
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Subcommittee on Communications
of the
Committee on Interstate and Foreign Commerce
Washington, D.C. 20515

February 22, 1978

Dear Mr. Wood:

On July 20, 1976, the Subcommittee on Communications held hearings on cable television regulation oversight. The importation of distant signals via satellite was demonstrated when Mr. Donald O. Williams, vice president of Cox Cable Communications in San Diego, testified from Los Angeles. That was the first time in the history of Congress that a witness testified long distance over a television screen-- a preamble to videoconferencing as you envision its use today.

Can videoconferencing be considered cost-effective? Perhaps, over the long run we shall see the usefulness of this concept when it brings together people in several different geographical locations in a way which would have otherwise been impossible.

I applaud your efforts to bring new technologies to the attention of the Congress and the public.

Sincerely,

LIONEL VAN DEERLIN, Chairman
Subcommittee on Communications

Mr. Fred B. Wood
Project Director & Research Scientist
Program of Policy Studies in Science
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Washington, D. C. 20052

LVD:mjd

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May 18, 1978

Dr. Fred Wood
Project Director & Research Scientist
The George Washington University
Program of Policy Studies in Science
and Technology
Washington, D. C. -- 20052

Dear Dr. Wood:

May I take this opportunity to extend my deepest appreciation for your kind assistance in arranging my participation in the Agricultural Conference in Florida via satellite from NASA headquarters here in Washington.

Videoconferencing is an exciting new concept and innovation. Congressional videoconferencing, in particular, opens the prospect for a new era in representative democracy.

The very concept of democracy implies open government, where the people can participate and understand what actions affecting their lives are being taken. Indeed, this concept has the potential of revolutionizing our government processes by bringing the people into more intimate contact with their government in an open, face-to-face, two-way active exchange of views. There could be nothing better to help restore flagging public confidence in our democratic institutions than direct participation by the people.

In addition, videoconferencing will, no doubt, play a significant role in saving a tremendous amount of energy through the reduction or elimination of travel by the participants, not to mention its potential for medical, agricultural and educational benefits.

Your project and research work is to be commended. It effectively demonstrates just one small part of the tremendous returns, benefits and future possibilities our space program and satellite technology can offer a rapidly changing world.

Sincerely,

DON FUQUA, Chairman
Subcommittee on Space Science
and Applications

TIMOTHY E. WIRTH
SECOND DISTRICT, COLORADO

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February 27, 1978

Mr. Fred B. Wood
Project Director and
Research Scientist
The George Washington University
Program of Policy Studies in
Science and Technology
Washington, D.C. 20515

Dear Mr. Wood:

Thank you for sending me a draft of your report on congressional videoconferencing. Please feel free to use the following paragraph in your final report.

This excellent and innovative experiment has shown that satellite technology can provide us with closer constituent communications accompanied by savings of taxpayers' money, and energy as well. The report is a long first step--one that should be followed up quickly by serious Congressional consideration.

I hope this meets your needs.

With best wishes,

Sincerely yours,

Timothy E. Wirth

Timothy E. Wirth

TEW:dac

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COUNSEL

February 24, 1978

Mr. Fred B. Wood
Project Director and Research Scientist
Program of Policy Studies in Science and Technology
The George Washington University
Washington, D.C. 20052

Dear Mr. Wood:

I appreciated the opportunity to review your report on satellite videoconferencing. As you are aware, the Committee on Rules recently issued a report entitled "Broadcasting the Proceedings of the House," wherein it recommends that the Speaker instruct the committee to which he delegates responsibility for House broadcasting to propose, no later than the end of the 96th Congress, a plan for satellite transmission of House broadcast coverage.

The potential of using a satellite system to distribute the proceedings of the House presents an exciting possibility both to strengthen our legislative process and to stimulate greater constituent interest. It would appear that several aspects of satellite usage for broadcasting House proceedings and for videoconferencing are similar. The results of your study should thus be most useful to the House as we develop our future plans for the possibilities related to satellite transmission of congressional activities.

With kindest regards, I remain,

Sincerely yours,

Gillis W. Long
Chairman

JOHN B. ANDERSON
16TH DISTRICT, ILLINOIS

CHAIRMAN, REPUBLICAN CONFERENCE

MEMBER:
JOINT COMMITTEE ON ATOMIC ENERGY

COMMITTEE ON RULES

MICHAEL J. MASTERSON
ADMINISTRATIVE ASSISTANT

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DON WOLFENSBERGER
LEGISLATIVE ASSISTANT

February 28, 1978

Mr. Fred B. Wood
Project Director &
Research Scientist
Program of Policy Studies in Science & Technology
The George Washington University
Washington, D.C. 20052

Dear Mr. Wood:

Thank you for sharing with me the report on your congressional videoconferencing project. As one who has long been a proponent of broadcasting House proceedings as a way to better inform the public of public policy issues we debate and how we operate, I commend your experiment as a further step in making our democracy a two-way process.

I think the utilization of satellite technology, combined with existing broadcast capabilities, will indeed revolutionize our governmental processes by bringing the people into a much more intimate contact with their government. At a time when there is legitimate concern over voter apathy, I think the potential of both televising congressional debates and holding videoconferences between Congressmen and local groups can help to reverse this trend by making government more immediate and interesting.

I look forward to the time when this form of satellite broadcasting can bring the U.S. House into American homes.

With all best wishes, I am

Very truly yours,

John B. Anderson

JOHN B. ANDERSON
Member of Congress

JBA:drw

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ACKNOWLEDGEMENTS

The first-year success of the congressional videoconferencing project depended in large part on the cooperation and hard work of NASA technical and management personnel at several NASA locations:

NASA Lewis Research Center:
Pat Donoughe (the CTS Project Manager),
Howard Jackson (who serves as NASA's technical officer for the congressional videoconferencing project),
Erv Edelman (who is responsible for the Portable Earth Terminal),
Tom Godwin (who handles satellite scheduling), and
Joe Fiala,
along with the rest of the CTS project team.

NASA Goddard Space Flight Center:
Al Whalen,
John Chitwood, and
Don Overson,
along with the TV central team

NASA Ames Research Center:
Brad Gibbs and
Larry Hofman

NASA Headquarters:
Wasyl Lew (the CTS program manager) and
Patricia Boyce (responsible for the NASA Hqtrs. studio).

The direct participation of the following Members of Congress and their staff persons was also essential to the project's success:

Rep. Charlie Rose (John Merritt, Rebecca Harrington, Neal Gregory, and Bill Hartnett)

Sen. Adlai E. Stevenson (John Stewart, Steve Flajser, Anna Fotias, and John Taylor)

Senators Harrison Schmitt (Gerald Kovach), Barry Goldwater, and James B. Pearson of the Subcommittee on Science, Technology and Space.

Rep. Paul McCloskey (Kristen Arnold, Helen Pickering, John Kohler, and Laurette Rash)

We also want to thank the members of the public who participated in the videoconferences:

Hoke County, North Carolina, high school students and public officials (county commissioners and Mayor of Raeford), and especially
Don Steed and Ben Johnson of Hoke County High School who handled local arrangements for the videoconference with Charlie Rose.

Public officials, faculty members, industry representatives, and other citizens of Illinois and Wisconsin who testified via satellite before Senator Stevenson's subcommittee.

Psychologists from Santa Clara and San Mateo Counties, California, who participated in the videoconference with Congressman McCloskey.

Many other congressional staff persons provided guidance and support in the planning of videoconferences, including:

Marian Bruner (Sen. Mark Hatfield), Ann Cheatham and Lena Lupica (Congressional Clearinghouse on the Future), Faith Dubin (Rep. Jim Weaver), Toni Durkin (Rep. Norm Mineta), Sally Fisher (Rep. Don Edwards), Tom Hall (Sen. Howard Metzenbaum), Chuck Jackson and Mona Knight (Rep. Lionel Van Deerlin), Dick Maynard (House Information Systems Office), Don Moore (Rep. John Brademas), Walker Nolan (Sen. John Glenn), Ralph Pugh, Jim Wilson, and Darrell Branscome (Rep. Don Fuqua), Aileen Rinsky (Sen. John Culver), Art Sando, Dan Costello, and Rosemary Storey (Rep. James Hanley), Donald Tacheron (Sen. Lee Metcalf), and Bob Woodrum (Sen. Wendell Anderson).

Members and/or staff from the following offices participated in the survey interview phase of the research, conducted in 1973-74:

Rep. Brock Adams (now Secretary of Transportation), Rep. John B. Anderson, Rep. John Brademas, Sen. Bill Brock (now Chairman of the Republican National Committee), Rep. Garry Brown, Rep. Yvonne B. Burke, Sen. Howard W. Cannon, Rep. Bill Chappell, Rep, James C. Cleveland, Rep. William S. Cohen, Rep. Barber B. Conable, Sen. Alan Cranston, Rep. John C. Culver (now Senator), Rep. William L. Dickinson, Sen. Thomas F. Eagleton, Rep. Don W. Edwards, Rep. John N. Erlenborn, Rep. Donald M. Fraser, Rep. Thomas S. Foley, Rep. Gilbert Gude (now Director of the

Congressional Research Service), Rep. Augustus Hawkins, Rep. H. John Heinz (now Senator), Sen. Charles M. Mathias, Rep. Robert McClory, Sen. Lee Metcalf, Sen. Walter F. Mondale (now Vice President of the United States), Rep. William S. Moorhead, Rep. Charles A. Mosher (now Executive Director of the House Science and Technology Committee), Rep. John E. Moss, Rep. Charles B. Rangel, Rep. Ralph S. Regula, Rep. Donald W. Riegle (now Senator), Rep. Teno Roncalio, Rep. Patricia Schroeder, Rep. B. F. Sisk, Rep. William A. Steiger, Sen. Adlai E. Stevenson, Rep. Morris K. Udall, Rep. Lionel Van Deerlin, Rep. Joe D. Waggonner, and Rep. Bob Wilson.

David Green, Manager of the Educational Television Center in Menlo Park, California, and Dave Fornshell and Ed Eakins of the Ohio Educational Television Network were generous of their time and assistance with respect to the planning of potential public/educational/cable TV participation in the congressional videoconferencing project.

Finally, we appreciate the continuous encouragement and moral support from Louis H. Mayo, Director of the Program of Policy Studies and GWU Vice President for Policy Studies and Special Projects.

Notwithstanding the involvement and support of all those listed above, the evaluations and conclusions in this report are solely the responsibility of the authors and do not necessarily reflect the views of any organizations with which they are or have been affiliated.

PART I. FIRST-YEAR RESULTS

A. INTRODUCTION

1. Purpose of Research

Close to the heart of the American political system is the process of communication between citizens and their elected representatives. At the congressional level, telecommunications technologies--like the telephone and broadcast television--already play a significant role. But the job of the congressman continues to get more demanding. And citizen demands for participation in the legislative process continue to get stronger.

The purpose of this research is to evaluate--through actual demonstrations--whether satellite videoconferencing, one particularly important new technology, can help or hinder the political and legislative process.

In order to develop an answer, we designed and implemented several real-time demonstrations of congressional videoconferencing via satellite, with the direct participation of Members of Congress and their staffs and constituents.

2. History of Research

Constituent communication is essential to the job of the Congressman in his role as: a public official working to carry out important legislative and representative responsibilities, an ombudsman for constituents who need help, and an overseer of federal programs and monitor of their effects on citizens. Indeed, the system of communication between Congressmen and citizens is perhaps one of the most important in our society.

Recent studies have confirmed that telecommunications technologies--in the form of the telephone, audio and videotapes, telefacsimile, MT/ST, and the like--already play an important role in constituent communication.[1] But these studies have also documented signs of stress. Congressmen complain, for example, that effective communication with constituents is becoming more difficult due to: longer House sessions and heavier Washington workloads, increasing demands on personal time and energy, and greater complexity in issues and legislation. And as revealed in a comprehensive Lou Harris survey,[2] more citizens perhaps now have a desire to participate in the legislative process but find it difficult to do so due in part to the inadequacy of current communication channels.

At the same time, American society is well into the so-called "Communications Revolution,"[3] a period when many of the major new tools of society are communications technologies like the computer or satellite. Can emergent communication channels--such as the videoconference--play a role in resolving these problems and offer significant improvement over existing modes of constitutuent communication?

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[1]See Fred B. Wood, Telecommunications Technology for Congress: An Exploratory Assessment of its Potential for Congressional-Constituent Communication (Ann Arbor, Mich.: Xerox University Microfilms, 1975), esp. Chap. 6 on "Current Congressional-Constituent Communication System." For a summary, see Fred B. Wood, The Potential for Congressional Use of Emergent Telecommunications: An Exploratory Assessment, Mon. No. 20 (Washington, D.C.: Program of Policy Studies in Science and Technology, The George Washington University, May 1974).

[2]U.S. Senate, Committee on Government Operations, Subcommittee on Intergovernmental Operations, Confidence and Concern: Citizens View American Government (Washington, D.C.: GPO, December 1973), public opinion survey conducted by Lou Harris. These findings were confirmed in a September 1977 Harris survey.

[3]Fred B. Wood, "An Integrative Framework for a New Frontier," Communications Theory in the Cause of Man, Vol. 1, April/May 1971, pp. 3-36.

Until 1973, answers to this question with respect to Congressional use were based largely on "intelligent speculation" or "reasoned conjecture."[4] However, in 1973-1974 a major study on the potential for Congressional use of emergent telecommunications arrived at more definitive answers based on the attitudes and perceptions of Congressmen themselves.[5] The potential and limitations of several emergent channels were identified through interviews with a stratified judgment sample of U.S. Representatives and senior staff from the 93rd Congress. Three channels--cable television, information retrieval, and the videoconference--were perceived by more than half of the Congressmen and staff as being potentially useful for constituent communication.

The results of the landmark study cited above, however convincing, were based on perceptions of future use, not on actual "hands-on" experience. The study concluded that additional research, and especially demonstrations such as the ones reported here, would be necessary to arrive at the more authoritative answers required by policymakers and the general public.

Given further research along these lines, the study suggested that the public benefits and risks could be identified and thus serve as a basis for appropriate policy decisions. In this way, the study concluded, the potential

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[4]See, for example, Herbert Goldhamer, The Social Effects of Communications Technology (Santa Monica, Calif.: Rand Corp., 1970); Harold Sackman, Mass Information Utilities and Social Excellence (New York: Auerbach, 1971); and Edwin B. Parker and Donald A. Dunn, "Information Technology: Its Social Potential," Science, Vol. 176, June 30, 1972, pp. 1392-1399. Also see Robert L. Chartrand, Computers in the Service of Society (New York: Pergamon, 1972), esp. "The Congressional Role" by Rep. John Brademas, at p. 155.

[5]Supra note 1, see esp. Chap. VII, summarized in Fred B. Wood, "Congressional Perceptions of Emergent Telecommunications," Technological Forecasting and Social Change, Vol. 8, 1975, pp. 189-212. Also see Fred B. Wood, "Congressional-Constituent Telecommunication: The Potential and Limitations of Emergent Channels," IEEE Transactions on Communications, Vol. 23, No. 10 (October 1975), pp. 1134-1142.

of emergent telecommunications for serving the public interest and strengthening democratic governmental processes would hopefully be realized.

Satellite systems first developed by NASA are providing new capacity for meeting many human needs, including those of the political and legislative process. The Communications Technology Satellite (CTS) used in these demonstrations incorporates the latest generation of satellite technology. In general, CTS is being used to probe the social, cultural, and economic impacts of this technology and to help identify new applications and provide better data for planners and public policymakers.[6]

To generate this new knowledge, experiments using the CTS are being carried out by a wide spectrum of user groups in four categories: education, health care, community and special services, and technology extension.

The congressional videoconferencing project, described in detail in the following pages, is a logical extension of the NASA experiments into the area of government communication in general and legislative branch communication in particular. The congressional videoconferencing project falls within the community and special services category of NASA-sponsored experimental activity.

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[6]NASA, Communications Technology Satellite (Cleveland: NASA-Lewis Research Center, January 1976).

B. EXPERIMENTAL DEMONSTRATIONS

1. Congressional-Constituent Meeting: Large Group, Rural Area, Questions-and-Answers with Students on Current Public Issues

a. Description of the Videoconference

Many congressmen are making use of mobile offices and multiple district offices in an effort to keep in better touch with their constituents. Still, the demands on the congressman's time cannot all be met. This is especially true for congressmen from rural districts where the population is distributed over a wide geographic area.

Rep. Charlie Rose comes from such a rural district where there are many individuals and groups who would like to meet with him but who cannot afford the time or money to come to Washington. Congressman Rose gets back to his district as often as he can, but there is no way he can find the time to meet with everybody.

This first videoconference took place on April 15, 1977, with Rose in Washington, D.C. at the NASA Headquarters studio at 600 Independence Avenue, N.W., just 7 or 8 blocks down the street from his Capitol Hill office. Rose talked for about 1½ hours over the satellite with high school students and faculty from Hoke County High School in Raeford, North Carolina. Raeford has a population of about 3,000 and is located 20 miles southwest of Fayetteville.

The students--about 150-strong--sat in the school library with a panel of 5 students designated to ask questions of Congressman Rose. NASA's Portable Earth Terminal (a bus outfitted with all necessary electronic gear

and a satellite antenna) was parked outside next to the library. The portable TV camera and four monitors were set up inside the library and connected to the bus via cable. (See Figure One, Summary Report.)

Excerpts from the videoconference follow below:

ROSE (in Washington, D.C.): I believe that you all know that we are making quite a bit of history this morning. This is the first time in the history of our country that a Congressman has ever spoken to a group of his constituents over a satellite. . . .

As you know, we're going to chat for a while this morning, and I believe you have some questions to ask me. We can talk about many subjects. I hope that everybody just relaxes and that we have a good time at this. I want to talk with you about a lot of problems that face our country, and especially about the energy problem.

PRINCIPAL (in Raeford, N.C.): You see before you today a representative group of a fine student body here at Hoke County High School; one that I'm real proud of.

ROSE (Washington, D.C.): Thank you very much. And that's quite an impressive looking crowd you've got there. Let me start off by laying a little background for you on the energy problem that we've been dealing with here in Washington lately.

(After the Congressman's opening remarks on energy, the students in Raeford, N.C. discussed with him various aspects of the energy program and how it might affect the citizens of Hoke County. Rose then asked for questions from the student panel on any topic.)

STUDENT: Congressman Rose, there's currently legislation pending in Congress which reforms the system of airline regulation. I'm referring specifically to the Cannon/Kennedy bill. From what I have read about these

bills, it appears they could cause closing of air service to small and middle size cities. What is your opinion of the proposed legislation?

ROSE: I don't think very much of it, for exactly the reason that you implied in your question. I'm afraid that a lot of the airlines would want to serve just the large population areas and forget about the smaller communities, if we allow the total deregulation of that industry. I am going to be very cautious about supporting that bill. I am not going to support it unless I'm convinced that it's going to improve the airlines transportation services to the smaller communities of America.

(The students continued with questions on utility rates, textile imports, and tobacco allotments.)

STUDENT: With the present Social Security System people who have never worked or paid in benefits can in some cases collect. My parents, like many other couples, both work and pay for benefits. But should either one die tomorrow, the survivor would not be able to collect on both. Why do you think this is fair, and what do you intend to do about it?

ROSE: It's a good question.

STUDENT: See, both of my parents have been working, and they both pay social security, not because they want to, but because the government requires it. And if my father were to die tomorrow, my mother could not collect hers and his social security. It would have to be one or the other.

ROSE: That's a pretty technical point, a very good one. I'll have to look into that. I don't really know whether or not anything's been proposed that would solve that problem. The question is about a basic inequity in the Social Security program. I'm going to look up your technical question. Give me your telephone number and I'll give you a call when I find out. You don't want everybody to know your phone number, maybe?

STUDENT: I don't care.

ROSE: Thank you. I'll give you a call on that, okay? Any other questions?

(The panel of students continued with questions on decriminalization of marijuana, the Equal Rights Amendment, seizure of Soviet fishing vessels, the quality of public education in North Carolina, the $50 rebate, and the congressman's committee assignments. Students in the audience were then given an opportunity to participate.)

PRINCIPAL: Congressman, we have some students here in the audience who would like to ask you questions, and we'll go to that now for a few minutes, if that will be all right.

STUDENT: I would like to know if you are in favor of the U.S. lifting its embargo on Cuba. Why or why not?

ROSE: I have real mixed emotions about lifting the embargo on Cuba. Here again I'm not convinced that it's going to do us that much good. I really--to be honest with you--haven't studied the proposals in that much detail. Until somebody can convince me that lifting the embargo on trade with Cuba is going to be that helpful to this country, I don't think we should engage in trade with them.

(The discussion closed with questions on the new Congressional Code of Ethics and abortion.)

PRINCIPAL: My friend, you did real well. They put you on the spot, and you came through with flying colors. On behalf of the school system, I'd certainly like to express my deep appreciation to you for giving us this honor.

ROSE: Thank you. Where did you park the mobile ground station? Where abouts is it on the school grounds?

PRINCIPAL: The bus is parked right back of our brand new library and media center. The bus is in a big open area, with the antenna looking southwest.

b. Reactions of the Participants

Congressman Charlie Rose: "One of the reasons that this satellite technology is so exciting to us in Congress is that, by having this satellite hookup, we are able to address you back home where you live and talk specifically about things that bother you in Hoke County or in the 7th Congressional District of North Carolina."

Ben Johnson, chairman of the history department at Hoke County High School, was responsible for the student participation. "I picked pretty dependable students to be on the panel. I thought they handled the situation real well, even though Rose asked them some questions they weren't really prepared for." Ben talked with the kids after and observed that, "the kids by and large found the videoconference to be very enjoyable and were fascinated by it. It was the first time that the vast majority of these students had an opportunity to see their congressman. As an indication of their strong interest, about half of the students stayed to see the second videoconference between Rose and the Hoke County commissioners."

Ben felt that "there was a real dialogue between Rose and the students. The students were able to ask Rose some controversial questions. They could see when Rose was taking a stand, but also when he was fudging. It

is an effective way to communicate, much better than writing letters. You could see Rose respond and, on occasion, see him squirm." Ben found the videoconference to be really very intimate. "It's just like sitting in a room with Rose. After a few minutes, you even forget that there is a TV screen."

In Ben Johnson's opinion, the videoconference had a significant impact on the school and community as well as on the students. "Lots of students don't have time to watch the news. So this videoconferencing can help increase their awareness of public issues."

"The kids were hyped about the videoconference," observed Johnson. "It's a big deal for a rural community. There were big write-ups in the Raeford News-Journal. The whole back page was devoted to the videoconference, half of the write-up on the students participating and half on the satellite technology. The videoconference was also covered by the Fayetteville newspaper and by Channel 6, the nearest network TV affiliate, with spots appearing on both the 6:00 p.m. and 11:00 p.m. local newscasts."

Ben observed that, "within two years, all of these students will be voters. And the videoconference captured the interest of many parents as well. A lot of kids asked questions suggested by their parents."

2. Congressional-Constituent Meeting: Small Group, Rural Area, Discussion with Public Officials on Pending Federal Actions with Local Impact

a. Description of the Videoconference

In addition to regular contact with the general public, congressmen have to keep in frequent touch with local public officials and representatives of local business and government in the district. Unlike the major corporations or high officials in state government or national lobby groups, e.g., Sierra Club, Chamber of Commerce, or Consumer's Union, local public officials can rarely afford the time or money to come to Washington to meet with their congressman. They do try to make the most of their congressman's trips home. But many issues and problems come up on short notice while Congress is in session and require immediate discussion if inputs are to be timely.

This problem is particularly severe for congressmen like Charlie Rose who come from a predominantly rural district with many small towns and thus have many local public officials with which to keep in touch. In order to test the potential of satellite videoconferencing for meeting this need, a second videoconference was scheduled to follow the meeting with high school students.

This second videoconference took place with Rose in Washington, D.C., at the NASA-HQ studio as before. Rose talked for about one hour over the satellite with the Hoke County Commissioners, the Mayor of Raeford, and other local public officials. The seven or eight officials sat in the school library, as did the students earlier, and conducted their meeting with the Congressman, as excerpted below. (See Figure Two, Summary Report.)

TV NEWSMAN (in Raeford, N.C.): We're in Raeford today, to talk with our Congressman, Charlie Rose. But he looks a little far away.

ROSE (in Washington, D.C.): I'm not only in Washington, D.C., but I'm in Raeford at the same time. And I think it's very worthy to note that you are about to witness the first county commissioner's meeting ever held with its Congressman over a space satellite.

(Each public official introduced himself to the Congressman.)

CHAIRMAN (in Raeford, N.C.): Congressman, what do you think the future of revenue sharing holds for county and city governments?

ROSE: I know that you need the revenue sharing funds that have been provided. I think the spirit in the Congress right now is very supportive of the revenue sharing program and its continuation. I would urge you, though, not to let your guard down. The President in my opinion is very serious about balancing the budget. It may be that revenue sharing is one of the areas the President is going to look at to see if he can save any money. If there's anything to cut out in revenue sharing, my position will be that we cut out the support that goes to states. I hope we don't have to cut anything out, but I clearly perceive that you fellows make very efficient use of the revenue sharing funds that have come to you from Washington.

CHAIRMAN: Going back to revenue sharing again, we are now using guidelines that were established to begin with by the Justice Department, the Labor Department, and the Civil Service Commission. Now, as I understand it, new regulations by the Equal Employment Opportunity Commission might lead to some revenue sharing funds being cut off. We're a little disturbed about this because, as I understand it, they can't cut off our funds without a hearing. Is this true?

ROSE: (Sigh) Gentlemen, I'm not aware that they can cut off your funds without a hearing. I'm going to look into your specific question, and I'll give you a call on it. I can't believe that you could be cut off without some kind of hearing.

(The Chairman turned the microphone over to the other public officials in attendance, who began with questions on a local dispute between two towns over annexation of a U.S. military base and on the future of farming under the Carter Administration.)

OFFICIAL: Congressman Rose, I deal in planning grants, and we have one that is in the hands of the EDA (Economic Development Administration) for rescoring. Could you give us any kind of a report on that?

ROSE: Is this the grant requesting some of the 30 percent money? Which category of matching funds was that grant in?

OFFICIAL: We were in the 30 percent category, sir, and it was turned down originally because of over-concentration of funds. The grant was for expansion and renovation of our health clinic and expansion of our rescue squad building.

ROSE: All right. John Merritt, my Administrative Assistant, I see standing over behind you. Ask him to come over to the microphone. John, I think you and I discussed this one time up here, that their grant was for a 30 percent requent?

MERRITT: Right, and under the new EDA appropriations, it's in conference right now. They're doing away with the 30 percent and 7 percent categories, and they're lumping them all together into one category and are in the rescoring process right now. The problem is that Senator Muskie has the thing tied up because of that Waterway User's Tax.

ROSE: What we need to do--and I will make a note when we both get back up here on Monday together--is to check and see how this law as it's expected to come out of Congress would impact their request. We may have to do a little retooling on it.

MERRITT: There are two greatly different versions, the Senate version and the House version, and they are in conference right now. Each one will have a little different impact on Hoke County, and I'll try to keep abreast on Monday of what the differences will be if each one passes.

ROSE: Okay. We'll get back to you in Hoke County as soon as we know what the bill's going to look like.

(Questions followed on reducing Federal red-tape, the President's energy program, legislation on Native Americans and Indians, outlook for the Federal highway program, and a pending request for a Section 201 Facility Grant from EPA, the emergency jobs program, and the minimum wage bill.)

ROSE: Gentlemen, I really appreciate your time this morning. I've enjoyed this, and maybe we can do it again sometime.

CHAIRMAN: Thank you, Congressman. I think it's been very constructive. And I hope we can indeed do it again.

b. Reactions of the Participants

There was no doubt that Rose came across well on the videoconference. He was asked, what about members of Congress who don't have a way with the media? "They will have to learn. It is the reality of today." What about members who don't want more citizen contact? "When members of Congress don't want contact with the people in their district, that's when they aren't returned to Congress."

Congressman Rose would like to see the Congress use satellite videoconferences to help keep the Congress in touch with the people. In the words of John Merritt, administrative assistant to Rose, "We believe satellite videoconferencing is a phenomenal concept for opening up Congress to the public and allowing more public access. Right now, if you look at who testifies before Congress, you find mostly the lobbyists for special interests who can afford to fly to Washington or work here permanently. Using the satellite to open up citizen participation could greatly enhance the public image of Congress as an institution."

Mr. George R. "Raz" Autry, Superintendent of Hoke County Schools, helped arrange the participation of public officials. He said that "probably without overstatement, the officials were as enthusiastic about the videoconference as just about anyone else. They are unlimited in their praise of this activity."

Raz observes that "we don't get very much opportunity to talk with our congressman. This videoconference allows Rose to get right down to the grass roots and talk with the students who will be making decisions tomorrow and the public officials who are making decisions today."

Telephone calls and letters just won't do, says Autry. "It's not the same without video. You have to be able to eyeball people to have effective communication. The eyes are the window to the soul. With video, you can tell whether Rose is telling it straight. It's the next best thing to meeting with him in person face-to-face." Perhaps the most important benefit is "to give the youngsters and the local leaders an opportunity to talk directly with their congressman without any intermediaries. The videoconference gives them a chance to talk with the man himself."

3. Congressional Subcommittee Hearing: Witnesses at Field Locations, Testimony on S. 421, to Establish a National Climate Program

a. Description of the Videoconference

Much of the time of many Senators and Representatives in Washington is spent in committee and subcommittee hearings. Indeed, such hearings are at the heart of the legislative process. On any given day when Congress is in session, several dozen subcommittee hearings may be in progress simultaneously.

Tight scheduling of subcommittee hearings and the overwhelming workload of most congressmen means that people must come to Washington to testify or depend on lobbyists to represent them. Congressional committees rarely have time to conduct hearings out in the field around the country, except during recess periods. As a result, the large majority of Americans are effectively excluded from the hearing process.

The major purpose of the third videoconference was to test the potential of satellite communications for use in a congressional hearing. This videoconference took place between Senator Adlai E. Stevenson and the Subcommittee on Science, Technology and Space,convened in Washington, D.C. with testimony via satellite from public witnesses in Springfield, Illinois.

The Senators were located in Room 5110 of the Dirksen Senate Office Building, the Subcommittee hearing room, with cameras, lights, and related equipment brought in from Goddard Space Flight Center. The cameras in Room 5110 were connected via a microwave link to the satellite transmitter and antenna at Goddard. The hearing lasted about 3½ hours.

The public witnesses--a total of ten divided into three panels--sat in a courtroom on the second floor of the Federal Building in Springfield,

Illinois. Witnesses were from state agencies, universities, and private firms. NASA's Portable Earth Terminal (a bus outfitted with all necessary electronic gear and a satellite antenna) was parked outside next to the building. The portable TV camera and four TV monitors were set up inside the courtroom and connected to the PET via cable. (See Figure Three, Summary Report.)

Excerpts from the videoconference follow below.

The Subcommittee met on June 8, 1977 at 9:05 a.m. in Room 5110 of the Dirksen Senate Office Building for hearings on S. 421, the National Climate Program Act, with the Honorable Adlai E. Stevenson, chairman of the subcommittee, presiding, and Senators Harrison Schmitt, Barry Goldwater, and James B. Pearson in attendance.

STEVENSON (in Washington, D.C.): The Subcommittee will come to order. This morning we will hold hearings on a subject which is fairly new to the Congress and by means which are new,

We hold hearings on climate including S. 421 introduced by Senators Pearson and Schmitt to establish a national climate program, and by satellite link to our witnesses in Illinois.

SCHMITT: Thank you, Mr. Chairman.

As you have indicated, this is an extremely important set of hearings that we are commencing today, an importance that has been accented by my recent tour of the drought stricken counties of eastern New Mexico which are part of a large area of the western United States that has suffered from a lack of rainfall and snowfall over the last two years.

(Following the complete opening remarks, Dr. Richard S. Cooper, director of NASA's Goddard Space Flight Center, addressed the subcommittee to explain the concept of public service communications and the role of the Communications Technology Satellite.)

COOPER: I think it's particularly appropriate and interesting that your Subcommittee should be working with us today. This experiment will certainly serve the Subcommittee's purposes of getting closer to the people and being able to meet directly with them by videoconferencing, in this case, on legislative matters which are really vital to the Nation's interests. But it also meets for us a new research objective within NASA which is to understand better the societal impacts of the technology that we are creating.

STEVENSON: Any questions or comments?

GOLDWATER: I just wanted to comment. I think I took part in one of the first transatlantic debates via satellite a number of years ago. Our Secretary of State and I debated the foreign ministers of England and France.

And what was interesting was to observe the lack of synchronization with your lips, and what you pick up on the screen because of the time it took to go up and down. I never did figure it out. But it drove me crazy sitting there speaking and watching my lips maybe a hundredth of a second behind.

STEVENSON (in Washington, D.C.): We thank you very much, and we want to thank our witnesses in Springfield as well. I can see our witnesses very clearly. I hope they can see and hear us.

They are Ms. Linda DeGrande of Cargill Investors; Mr. Erie Jones, Director of Emergency Services for the State of Illinois; Fay Orr, an Illinois farmer grain elevator operator from Momence, Illinois; and Maxim Cohen, General Manager of the Chicago Regional Port District in Chicago.

Gentlemen, Erie Jones, can you hear us all right and see us?

JONES (in Springfield, Ill.): Very well. Can you hear me fine?

STEVENSON (in Washington, D.C.): I can hear you very well.

JONES (in Springfield, Ill.): Very good.

STEVENSON: Shall we start with you, Mr. Jones.

(Each member of the first panel of witnesses read their opening statements, followed by questions from the Senators.)

STEVENSON: Thank you, Mr. Cohen. Would a better ability to predict weather have any effect on the management of shipping or rail transportation all year around in Chicago?

COHEN: Yes, Mr. Senator.

If we had accurate information, we could better calculate what our span of hard weather is going to be. By that I mean the inclement conditions that we have in the late fall and early December. Frequently we are caught, as I might say, at the last minute with a ship that is partially loaded. We can't do anything about it, and the vessel must leave in order to make its passage to the St. Lawrence Seaway.

STEVENSON: You have been very helpful. I hope if you have any further suggestions to us, you won't hesitate to send them along. But we had better keep moving if we are going to get all of our witnesses in this morning.

Our next witnesses are Dr. John Block, director of the Illinois Department of Agriculture, and Dean Orville Bently of the College of Agriculture at the University of Illinois.

Welcome, gentlemen. We are grateful to you for joining us.

(Each panelist read their opening statement, followed by questions from the Senators on the need and means for improved weather forecasting.)

STEVENSON: Our final panel consists of Professor Verner Soumi, from the Space Science and Engineering Center, University of Wisconsin; Dr. William C. Ackerman, Chief, and Dr. Stanley A. Changnon, Jr., Head, Atmospheric Sciences Section; and Dr. Paul Schickedanz, Illinois State Water Survey, Urbana, Illinois.

Could we begin, Professor, with you? As I indicated earlier, if you can summarize your statements, I will be happy to enter your written statements into the record. We are running a little short of time.

(Each panelist summarized their opening statement, followed by questions from the Senators.)

STEVENSON: Dr. Suomi, if I understood you, at the beginning of your testimony you said that it's impossible now to tell whether you can significantly improve our ability to predict weather. Is that right?

SUOMI: I think there is a chance. Believe me, Senator, if there was a crystal ball somewhere that would actually work, I would buy it. I think the need for improved forecasting for society is so great that we must attack the problem on a wide front.

STEVENSON: How do the other members of the panel feel? Are you an optimist? How do you feel about our ability to predict?

(The Senators and panelists then discussed in more detail the direct effect of climate on the quality of the human condition, and the technological capabilities needed to improve the prediction of climate and weather.)

STEVENSON: Thank you, gentlemen. NASA is about to pull the plug. We want to thank NASA for its cooperation and also George Washington University for helping to conduct this experiment in the use of satellite technology. I thank you. That concludes the meeting of this subcommittee.

(Whereupon, at 12:20 p.m., the hearing was adjourned.)

b. Reactions of Participants

Following are excerpts from the hearing of the Senate Subcommittee on Science, Technology and Space which give some insight to the reactions of participants:

SENATOR STEVENSON: Gentlemen, we are running a little short on time. But let me ask you, since you both have testified before legislative bodies, is this a satisfactory media for communication in a legislative hearing?

MR. BLOCK: I would have to say that I feel it's excellent. I think it's very exciting. And I can see you and see you quite clearly. We hear you quite clearly. And questions are readily understandable. And I hope that we have come across as clear as you have come across to us.

DEAN BENTLY: I would agree with Director Block's statement. There is a certain excitement to being in the same hearing room with you. We only see a section of what's going on in the room. And that I miss a little bit, but I also can, because I got up early this morning, get back home today. And it just takes me a half day, whereas otherwise, it would take me a day and a half if I had to travel to Washington. And that time saving is pretty important to us.

SENATOR STEVENSON: You have come through very clearly to us, both the image and the sound. And I have enjoyed a chance to be back in Illinois.

(Laughter.)

SENATOR SCHMITT: I might add, Mr. Chairman, that for once, they are missing two very fine days back here.

(Laughter.)

SENATOR SCHMITT: Ordinarily, the Washington weather in the summer may not be what you might like.

PROF. SUOMI: Thank you, Mr. Chairman. I will try to summarize my comments. This is a rather unique way of carrying out a hearing. And it may have taken me more time to get to Springfield, Illinois, from Madison than it did to go all the way to Washington. But as I mentioned, I have been to Washington many times, but never to Springfield, and I am very interested in Lincoln. So it is a real treat.

The real failure of the system, however, is that I haven't had the opportunity to shake your hands. You and the other members of the Committee.

SENATOR SCHMITT: We are asking them to work on it.

(Laughter.)

SENATOR STEVENSON: Thank you.

You have helped us a great deal with your comments about this experiment, as well as your testimony.

And what is more, the hearing has also developed a useful legislative application for satellite technology. With enormous potentials for the Congress by use of such technology as this, together with the witnesses, experts, members of the public, and indeed elsewhere in the world outside the United States, we can save time, save money, and use this satellite link as a means of dealing directly with the public in the deliberations of Congress.

John Taylor, special assistant to Senator Stevenson, helped arrange the witness panels in Springfield and provided these observations:

"The reaction of the panel participants was excellent. They all seemed to enjoy the experience and adapted quickly to the medium. The witness from Madison, Wisconsin, (Prof. Suomi) complained a little that he couldn't shake Stevenson's hand and it took him as long to get to Springfield as to

Washington. But in general the panelists felt that their time was saved and their contributions were effectively presented. The videoconference does lose some advantage if people have to travel too far to get to the studio."

"The overall political impact was favorable, with good local press coverage in Springfield and Decatur. Four TV camera crews showed up: the Champaign TV station which is a CBS affiliate; the Springfield TV station which is an NBC affiliate; the Decatur TV station which is an ABC affiliate; plus a network crew from CBS. The local stations ran footage, but I don't know if the network film was ever used."

In Washington, D.C., the hearing was covered by the Washington Post, Washington Star, AP and UPI, Knight newspapers, Copley News Service, Congressional Quarterly, Science and Broadcasting magazines, an audio feed to about twenty radio stations, and a WTOP-TV (CBS affiliate) TV crew. A film clip from the hearing was used on the 6:00 p.m. local news in Washington. Co-anchorperson Max Robinson commented that "the satellite technology has been around a long time; why hasn't the Congress done this before?" His colleague Gordon Peterson replied, "The cost, man, the cost. I'd like to know what this cost." To which Max responded, "But the point here is to prove it can work. The cost will presumably come down in the future."

4. Congressional-Constituent Meeting: Small Group, Urban Area, Discussion with Psychologists on H.R. 2270

a. Description of the Videoconference

While congressmen from rural districts have difficulty finding the time to stay in touch with people from remote areas, many urban congressmen find that they could spend 24 hours a day talking with people from the densely populated, politically active constituencies in the major metropolitan areas. Urban (and suburban) congressmen don't have as much geographic area to cover, but many times their constituents place greater demands on talking with them in person.

Rep. Paul "Pete" McCloskey comes from this kind of urban-suburban district in the San Francisco Bay Area, California. This district includes parts of San Mateo and Santa Clara counties and both Stanford and Santa Clara universities. McCloskey gives a high priority to constituent communication and has as good a record as anyone with respect to visits to the district. He has conscientiously held many "town meetings" with constituents from all over his district.

But despite this excellent record, McCloskey has still not been able to satisfy all the needs of his constituents to consult with him in person. This, of course, is partly due to the nature of his district, which is highly educated and politically active. But part of the problem is his ever-increasing workload in Washington which makes it almost impossible for him to spend as much time in the district as he might like.

The fourth videoconference was different in that it provided perhaps the optimal test of satellite videoconferencing, for these reasons. First, there were constituent communication needs that could not be met through

existing means. Second, McCloskey's district is sufficiently far from Washington such that travel time and expense become very significant. Third, the time zone difference between the East and West coasts means that McCloskey could use his evening time (when his Washington schedule is less hectic) while it was still late afternoon (and part of the regular business day) in California. Fourth, the NASA-Ames Research Center located in McCloskey's district has a satellite studio and antenna. Thus the Portable Earth Terminal is not required because constituents can reach the NASA studio with only a 20-30 minute drive.

Congressman McCloskey used the NASA-HQ studio in Washington, D.C., while a group of constituents--in this case professional clinical psychologists--used the NASA-Ames studio near Palo Alto, California. (See Figure Four, Summary Report.) On July 26, 1977, McCloskey talked for about one hour with the psychologists on the subject of whether or not clinical psychologists should be included as primary health care providers under federal health programs.

Excerpts from this videoconference follow below.

MCCLOSKEY STAFF PERSON (in California): Hello. I'm going to let all the people here introduce themselves and give you a little bit of information about their backgrounds and why they're here as experts to discuss H.R. 2270.

PSYCHOLOGIST (in California): I'm Dr. Arthur Bodin, past president of the California State Psychological Association, and a research associate at the Mental Research Institute, where I'm also the clinical director of the emergency treatment center. I've been chairman of the Committee on Social Issues for the State Psychological Association.

I might add that all four of us--Drs. Don Schultz, Charles Faltz, Norma Davies, and myself--are constituents of your district.

MCCLOSKEY (in Washington, D.C.): I think I have a higher per capita population of psychologists and psychiatrists than any other Member of Congress.

PSYCHOLOGIST: I believe you.

MCCLOSKEY: And how do you get along with the psychiatrists?

PSYCHOLOGIST: I would say relatively well up north, in Northern California. We've been meeting every two months with representatives of psychiatry and social work to see where we have substantial agreement. And one of those areas is of course on the importance of including mental health in any national health insurance package and on including outpatient, as well as the more expensive inpatient, service. That is something which all three professions are in agreement about.

MCCLOSKEY: Could I sort of frame the thoughts in my mind and throw it open to you. I have read a lot of papers that you have sent me.

(After the Congressman's opening remarks, the psychologists discussed with him various aspects of psychology and federal health programs.)

PSYCHOLOGIST: I think it's important for you to have the background that there was a great deal of opposition from some quarters.

MCCLOSKEY: Is this from the American Medical Association primarily? The doctors?

PSYCHOLOGIST: I don't know whether it was the physicians or the psychiatrists, but it was one of those two groups. By the way, we use the word physicians because we're also doctors.

MCCLOSKEY: I should refer to you all as doctors. What is the hope that the psychiatrists and medical societies of San Mateo and Santa Clara counties and your groups could get together and join in a recommendation to us? Are we always going to face this professional disagreement, or is there a possibility of some compromise between the professional groups?

PSYCHOLOGIST: As a member of the California Council of Psychiatrists, Psychologists, and Social Workers, I can tell you that the climate would be good in Northern California for such a statement. But the trouble is that the associated branches of the American Psychiatric Association have to follow the national policy which at the moment would bar them from such an agreement with us. I feel that the sentiment up here may be really contrary to national policy, but their hands are tied.

MCCLOSKEY: Quite often we find that in the medical groups the leadership of California quite often comes from Northern California, and occasionally the national group is led by California representatives. Do you have any hope of making them more progressive nationally? In so many things the leadership comes from the Bay Area--in new legislation, new concepts, new lifestyles, sometimes new nuts and cranks.

PSYCHOLOGIST: We're trying. We feel the relationships up here are relatively good, and we're trying to spread that theory.

(The meeting then turned to detailed discussion of medicare coverage, mental health group plans, co-payments, longer-term vs. brief therapy, psychosomatic illness, and the like.)

MCCLOSKEY: Can I stop at this point? We're at eight o'clock. We got started a little late, but I unfortunately made a commitment at eight fifteen. I'll be glad to meet further with you. Thank you for holding the meeting. At least, we would have taken an hour and a half to do this at home, and I'm going to have an awfully crowded week when I am home.

(Following the meeting with psychologists, Congressman McCloskey held a ten minute meeting over the satellite with his California staff. They discussed various casework problems and the itinerary for his upcoming trip to the district during the August recess.)

b. Reactions of Participants

Immediately following the videoconference, Congressman Paul "Pete" McCloskey said he was quite pleased and felt the videoconference was just as good as being there in person. He thought the major advantages were two-fold. First, he saved some of his own time because a meeting in person in the district might have taken twice as long as the videoconference. He did not feel any more time could be justified. Second, McCloskey was able to meet with a constituent group which he might otherwise never be able to work into his schedule. He is extremely busy when in California. By using the videoconference during the less hectic evening hours in Washington (7-8 p.m., Eastern Daylight Time), McCloskey was able to accommodate the psychologists during their working hours (4-5 p.m., Pacific Daylight Time).

McCloskey felt increasingly at ease with the new medium as the videoconference progressed. After talking with the psychologists for about an hour, he then spent about ten minutes or so talking with some of his district staff. They discussed an upcoming trip to the district and various events which were in the works, like panel discussions on the Reverend Moon controversy and the breeder reactor.

Kristen Arnold, a McCloskey aide who helped set up the meeting with the psychologists, was very impressed with the NASA facility. She noted that, prior to the videoconference, "I had a minor problem with the psychologists, who thought this was a publicity stunt for McCloskey. I straightened them out that this is supposed to be just like a regular constituent meeting."

Dr. Arthur Bodin, on behalf of the four psychologists, felt that "the videoconference was an excellent experience in a number of regards, even though we didn't get what we wanted--McCloskey's endorsement of H.R. 2270."

"First of all," explained Bodin, "McCloskey's image was clear on the screen. We could see his facial expressions. The videoconference generated a feeling of personal contact, almost as personal as sitting with McCloskey at a luncheon table. Of course, it must be recognized that McCloskey is very good at handling himself in these situations."

"Second, in some respects the videoconference is better than taking McCloskey out to lunch because there are no distractions. Everyone was all business, and the discussion was well-focused. On the other hand, there might be situations where the food and wine are important.

"Third, there is a considerable savings of time and money. It would have been prohibitive for us to fly to Washington, D.C. The satellite videoconference should be especially useful to congressmen from the West Coast in helping them keep in touch with people in their district. I would think it could be useful to anyone more than an hour or so away from D.C.

"Fourth, the videoconference should especially help those people who don't have good access to Congress. True, we had to get up out of our offices in Palo Alto and travel twenty minutes to the NASA studio in Mountain View. So the only thing I could think of to make it better would be a network with studios located in the community. I would encourage full development of the videoconference concept. It is a superb tool.

"Fifth, we think McCloskey will be more likely to remember the conversation because of the unique format.

"In summary," concluded Bodin, "there really wasn't a single negative thing about the videoconference. Although we didn't get what we wanted, we felt we had McCloskey's full attention. We felt the videoconference did justice to both McCloskey and the psychologists, to the extent that we followed up with an article in our local newsletter."

C. EVALUATION OF CONGRESSIONAL VIDEOCONFERENCING

1. Technical Feasibility

The first question congressmen and staff generally ask about satellite videoconferencing is: Will it work? If this series of demonstrations proved nothing else, it proved that satellite videoconferencing is technically feasible. The successful demonstrations with Congressman Rose, Senator Stevenson, and Congressman McCloskey, as described earlier, bear witness to this conclusion.

Without question, the Communications Technology Satellite (CTS) system is indeed experimental not operational, and the additional requirements and constraints inherent in an experimental system were obvious. However, the ultimate relevance of the project derives from the potential use of videoconferencing by congressmen and constituents on an operational basis.

The basic satellite videoconferencing system is technically sound. Difficulties that did arise reflect the experimental nature of the system and would be easily prevented in an operational system. Overall, the results of the experiment confirm the potential of high power satellites like CTS to make satellite videoconferencing available to congressmen and the public alike, through use of low-cost earth stations.

2. Economic Viability

The second question congressmen and staff frequently ask is: What will it cost? There was no direct cost to participants in this experimental program. The satellite and ground stations were developed as part of

NASA's overall satellite communications research program, and the congressional demonstrations are part of an authorized experimental activity conducted by The George Washington University. Technical support in the way of personnel and equipment was provided from NASA's already existing capability, with the exception of (a) the microwave interconnect which was leased from AT&T for use in the Stevenson demonstration, and (b) two additional TV monitors which were rented from local TV dealers for use in the Rose and Stevenson demonstrations.

In short, the purpose of this experiment was not to develop operational cost estimates but instead to demonstrate and evaluate the potential applications of satellite communications technology. The primary purpose was to test whether or not there is a real need for congressional videoconferencing and what the advantages and disadvantages might be. Actual operational costs will depend on the specific system configuration and public policy options, as discussed later in this report.

3. Are Videoconferences Useful?

A third question, and one to which this study gives major attention, is whether or not satellite videoconferencing can be useful to congressmen and constituents when compared to existing alternatives. An important purpose of the congressional videoconference demonstrations--and a major basis for answering this question--is to compare the results of demonstrations against the results of the interview survey conducted in 1973-1974. In effect, if properly evaluated, the demonstrations can test the hypotheses and conclusions of the interview survey.

The complete survey results have been published elsewhere.[7] By way of review, the initial sample size was 10% of the House (43 offices), with only three of the 43 declining to participate. Out of the 40 offices in the final sample, a total of 31 congressmen and 39 senior staff persons (primarily administrative assistants, known as AAs) were interviewed.

The congressional interviews yielded a fairly specific identification of the possible advantages and disadvantages for each emergent channel.[8] The results of the actual demonstrations have been presented earlier and will be compared here with the interview results.

a. Reach More People More Effectively

By far, the advantage cited most frequently in the 1973 interviews was the ability of videoconferences to help congressmen reach more people more effectively. This interview finding was borne out by the 1977 demonstration results. In all four videoconferences, the congressmen had an opportunity to meet with constituents who would not otherwise have been able to fit into their congressional schedule. This is certainly true for the high school students and local officials from Raeford, the psychologists from California, and most, but not all, of the witnesses

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[7] See Fred B. Wood, Telecommunications Technology for Congress: An Exploratory Assessment of its Potential for Congressional-Constituent Communication (Ann Arbor, Mich.: Xerox University Microfilms, 1975), esp. Chap. 7 on "Emergent Congressional-Constituent Communication System." For a summary, see Fred B. Wood, The Potential for Congressional Use of Emergent Telecommunications; An Exploratory Assessment, Mon. No. 20 (Washington, D.C.: Program of Policy Studies in Science and Technology, The George Washington University, May 1974).

[8] See Fred B. Wood, "Congressional Perceptions of Emergent Telecommunications," Technological Forecasting and Social Change, Vol. 8, 1975, pp. 189-212; and F. B. Wood, "Congressional-Constituent Tellecommunication: The Potential and Limitations of Emergent Channels," IEEE Transactions on Communications, Vol. 23, No. 10 (October 1975), pp. 1134-1142.

from Illinois. In all cases, the communication between the congressmen and constituents was felt to be just as effective as meeting face-to-face.

b. Significant Improvement Over Current System

The demonstration results here again confirmed the interview results in that demonstration participants found the videoconference to be clearly more effective than letters or telephone calls or not communicating at all, the major options under the current system, other than flying out in person.

c. Increase Citizen Participation and Feedback

The most significant finding, again where demonstration and interview results are quite consistent, may be that videoconferences encourage meaningful dialogue between citizens and their elected representatives. The two-way interactive nature of the medium seems to make it facilitate an open exchange of views and an honest, forthright approach to questions and answers--for both congressmen and constituents. It can be fairly said that, in these four demonstrations, citizen participation was meaningful and not a put-on.

d. Save Time and Energy

As predicted in the interviews, telecommunications is energy-conserving when compared to travel. The demonstrations provided evidence that videoconferencing can save the time of the participants, both through the reduction or elimination of travel and by the reduction of meeting time due to more-focused and better prepared participation. The same holds true for the personal energy (fatigue factor) of participants and the physical energy that would have been expended in travel.

e. Possible Abuse and Overuse

Some congressmen and staff in the interview survey expressed concern that videoconferencing might be used by congressmen to manipulate or stage-manage discussions with constituents or to otherwise abuse the notion of an honest, open dialogue. Based on the four demonstrations, this concern seems unfounded. In all cases, citizens with little or no media experience (especially the students and psychologists) were able to adapt quickly to the videoconference and participate in an even-handed dialogue with the congressmen, two of whom (Rose and McCloskey) are well-known for their media skills. For other participants, the results might of course be different.

As to the use of videoconferencing contributing to an unfair political advantage for incumbents, there is some basis for concern. Lou Harris and others have found that one of the most useful things a congressman can do is come home to the district and talk with his constituents. All four of the videoconferences were clearly advantageous to the congressional participants from a political perspective, not just in terms of the favorable impression left on the constituents but with respect to the good press generated via newspaper and TV coverage (in the case of Rose and Stevenson) and professional newsletters (in the case of McCloskey). This phenomena would be expected to wear off as videoconferences become more commonplace, and can perhaps be minimized if congressional videoconferencing is used primarily for legislative functions (e.g., committee or subcommittee hearings), and if the Congress is only one of many public users of a satellite videoconferencing system.

f. Citizen Interest and Understanding; Scheduling Problems

In the 1973 interview survey, many congressmen and staff were concerned that most constituents would not be interested in participating in video-conferences with their congressman and would have inadequate understanding of the issues to engage in a meaningful conversation. The results of the demonstrations do not support this claim. If anything, the constituents were eager to meet with their elected congressmen and had at least enough understanding of current affairs to hold their own. The events of the last 3-4 years may have had a profound effect on the American people, perhaps increasing their awareness of politics and decreasing their respect for politicians to at least a healthy skepticism. To many, this is a good sign for democracy and may mean that new forms of communication--like video-conferencing--are less amenable to control by political elites.

People problems are another story. People problems means primarily--and perhaps is better referred to as--scheduling problems involved in setting up a videoconference. A regular constituent meeting or town forum on the congressman's next trip home is difficult enough to arrange. The same goes for congressional hearings. The experimental videoconferencing system adds several more variables and complicates the entire process. Scheduling constraints were perhaps the major barrier to setting up the videoconference demonstrations. This is a real problem, but it is one which should be overcome in an operational system. Some options for developing such a system are discussed in a later section.

g. Person-to-Person Contact

There are two concerns here; one that videoconferencing will somehow be artificial and devoid of human contact, and, two, that videoconferencing

will induce congressmen to reduce their trips back to the district and substitute media contact for personal contact. While both of these concerns seemed quite realistic back in 1973, the evidence from the demonstrations is that videoconferencing is very much a humanized use of communications technology. Two-way, face-to-face, real-time, interactive discussion over a videoconference is exactly what happens when people meet in person. Apart from a few minor technical imperfections (e.g., in audio reproduction), the participants without exception adjusted to the videoconference format within minutes (or sooner) and felt almost as if they were in the same room with each other.

With respect to the possible substitution of videoconferencing for trips back home, none of the congressional participants--however enthusiastic about the videoconference itself--expected to reduce his district visits as a result. Videoconferencing is viewed as a complement, not as a substitute, intended to meet their ever-increasing communications needs which can no longer be accommodated through traditional means alone. Videoconferencing is especially geared to helping congressmen use their time and energy in Washington more effectively, while still being responsive to growing demands of citizens for discussion of an ever-rising agenda of pressing public issues.

h. Cost

One concern expressed in 1973 which is just as valid in 1977 is the question of financial cost. Whatever the benefits of videoconferencing may be, they have to be weighed against the financial costs of using the system. As mentioned earlier, cost was not an immediate factor in the four

demonstrations since there was no direct cost to the congressional or public participants, and all of the technical support costs were absorbed as part of NASA's ongoing satellite communications research program. Since for the most part existing NASA personnel and equipment were adequate, the actual direct costs to NASA were also relatively modest. In any event, the purpose of the experiment was to demonstrate or evaluate the utility and feasibility of congressional videoconferencing, not the cost-effectiveness. The actual cost will, of course, be a factor in the future use of videoconferencing, and will depend largely on the type of operational system which evolves in the U.S. and the terms and conditions of use which are applicable. Some of these considerations are discussed in the next section.

PART II. PUBLIC POLICY IMPLICATIONS

D. OPTIONS FOR AN OPERATIONAL VIDEOCONFERENCING SYSTEM

One of the objectives of this research is to help clarify public policy alternatives and options available to the Congress and other relevant policy-makers in regard to congressional videoconferencing and related emergent telecommunication channels.

1. Need for an Operational System

Policy alternatives and options become relevant only if congressional videoconferencing is found to be useful and worthy of further development and application. The results of both the congressional interviews (in 1973) and the more recent (1977) demonstrations strongly suggest that the congressional and public interest can be served through the development of an operational satellite videoconferencing system.

All of the congressional participants (Rose, Stevenson, Schmitt, Goldwater, McCloskey) strongly support an operational system because videoconferencing can help them reach more people more effectively, encourage citizen participation, save their time and energy, and--while not mentioned very often in the earlier evaluation--enhance the functioning of Congress as an institution.

Senator Stevenson felt that "the (June 8, 1977) hearing demonstrated the potential of public service technology to facilitate the functions of Congress." He believes that "many Senators would be interested in this kind of application and would like to have something done to bring the cost down so that the Senate can have a permanent videoconferencing capability."

Congressman Rose believes that "the videoconferencing concept is great and has been amply demonstrated in the GWU program. But we now have to move to an operational basis. The need is to move from demonstrations which have certainly been successful to a more operational system where various committees can plan on having access to the satellite to conduct hearings on a scheduled basis." However, Rose is concerned about the limitations on use of the CTS satellite and that it will end in a year or so. "What happens then?" he asks.

The consensus view of the congressional and public participants in the demonstrations, and of the congressmen and staff in the earlier interview survey, is that videoconferencing can be in the overall public interest as well as the congressional interest as long as (1) fair use and public access can be insured, and (2) unfair political use or abuse can be avoided.

2. Requirements of an Operational System

The most likely--and perhaps the only--way that the Congress will have access to videoconferencing on a regular basis will be through time made available on an operational system developed for commercial and/or public service use. Problems of fair use and access can be minimized if, once an operational system is available, the Congress is required to pay the going commercial or public service rates (just like the Congress does now for telephone and computer services), and if congressional use is limited to legislative applications (e.g., committee or subcommittee hearings).

Problems of fair use and access can perhaps be eliminated if the operational system provides low-cost public service time to educational, health, and community groups along with federal, state, and local government agencies. The Congress would then be only one user among many,

and would account for a very small percentage of total use. At this point of development, it might then be reasonable to include videoconferencing as a standard communications service available to congressmen for a variety of constituent service as well as legislative applications.

The requirements of an operational system suitable for use by the Congress and other public service users include low-cost earth stations and satellite time, videoconferencing studios, and House/Senate interconnect and origination capability.

a. Low-Cost Earth Stations with Next-Generation Satellites

One may ask why the satellite is so important to the future of video-conferencing. The major reason is indeed cost. For communication over distances beyond a few hundred miles, satellites offer significant advantages when compared with terrestrial (landline) systems like micro-wave. This is especially true for video applications which require a large bandwidth, where satellite transmission can offer a 50-90% cost saving over terrestrial.

However, for videoconferencing between many different points, as would be the case for congressional videoconferencing between Washington and the 50 states or 435 congressional districts, the current commercial satellite systems are still quite expensive. This is due primarily to the high cost of earth stations ($500,000 up to $5 million) needed to send and receive signals from the satellite, and to the high cost of the terrestrial link needed to connect the earth station to the ultimate recipient of a satellite signal.

The next generation of satellite (like the Communications Technology Satellite used in this experiment) can lower the cost of earth stations by at least an order of magnitude, to $50,000 per station and perhaps less, and will minimize or eliminate the need for terrestrial links. This is because the small, low-cost earth stations can be located right in cities on or near the user's premises or on a panel truck for mobile use.[9]

b. Low-Cost Videoconferencing Studies with This Generation Electronics

In addition to low-cost earth stations and satellite transmission, a videoconferencing system suitable for congressional use will need low-cost studios, because many studio locations will be required in order to have broad public access. This demonstration project was limited to the four permanent studios at NASA-HQ, Lewis, Goddard, and Ames, plus the one Portable Earth Terminal which has a small studio in the back of the bus.

Fortunately, low-cost studios--using portable TV cameras, simple lighting arrangements, and minimal furniture--have been demonstrated by NASA to be entirely satisfactory for videoconferencing. The cost is on the order of $20-50,000, depending largely on the quality and number of color cameras. Use of portable equipment does sacrifice some signal quality and does not always produce broadcast quality signals. If broadcast quality is desired or simply to take advantage of existing studios, public, educational, or commercial broadcasting facilities could easily be adapted for videoconferencing use.

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[9] John M. Richardson, "Domestic Satellites and the Public Sector," Bulletin of the American Society for Information Science, Vol. 3, No. 1 (October 1976), pp. 23-24.

c. Senate/House Interconnect and Origination Capability

Along with low-cost satellite transmission and low-cost earth stations and remote videoconference studios, congressional applications will require a Senate/House interconnect and origination capability. The U.S. Congress includes 100 Senators, 435 Representatives, about 40 major committees, over 100 subcommittees, plus the two chambers for floor proceedings, four major support offices (OTA, CBO, CRS, GAO), and several ad hoc groups (e.g., Democratic Study Group, Clearinghouse on the Future, Environmental Study Conference, Republican Research Committee). In order to keep costs within reason, origination facilities and hard-wired studios must be kept to a minimum,with flexibility built-in through a closed-circuit interconnect system.

Fortunately, again, much of the necessary capability already exists or is on the drawing boards as part of the communications support for routine House and Senate operations. Both the House and Senate have fully-equipped and staffed recording studios with cameras, mixers, lights, and other necessary origination equipment. With the completion of the Hart Senate Office Building, the Senate will have new hearing rooms designed specifically to accommodate electronic coverage. Both the Senate and House are considering ways to expand electronic coverage of floor activities. The House has successfully completed a 90-day test of closed-circuit TV coverage of House floor debate, and planning for regular electronic coverage is under way. Thus much of the necessary electronic infrastructure for a videoconferencing capability on the Hill will be in place soon.

3. Satellite System Options

Low-cost videoconferencing studios and House/Senate origination and interconnect capability are possible now. The major uncertainty in the development of an operational videoconferencing system--whether for congressional or any other public service use--is the availability of low-cost satellite transmission service and earth terminals. A number of options which may be able to provide this capability are discussed briefly below.

a. Bell System Picturephone Meeting Service (PMS)

The Bell System now offers a commercial common-carrier videoconference service between four selected U.S. cities, i.e., New York, Washington, Chicago, and San Francisco. Although the word "picturephone" is retained in the name, PMS is a videoconferencing system and offers much more than the original picturephone (which failed to survive early market tests). At present, PMS is a landline system using microwave and cable, but AT&T expects to incorporate satellite transmission links into the system in the early 1980s.

Charges for the service range from $75 per hour for a videoconference between Washington, D.C. and New York to $390 per hour between Washington, D.C. and San Francisco. Thus the cost for one hour of conference time roughly equals the price of one round-trip plane ticket.[10] The system has been used once by staff members of the Congressional Office of Technology Assessment, with quite satisfactory results.[11] The major constraints, of

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[10] Donald Vandergrift, "United States Bell Has Teleconferencing Too," Educational & Industrial Television, Vol. 9, No. 8 (August 1977), p. 31.

[11] Joseph F. Coates, "Methods and Techniques Memorandum No. 16," Office of Technology Assessment, U.S. Congress, August 3, 1977.

course, are the limited number of cities now being served and the need to use a Bell System conference room.

Further use by the Congress is possible, if Bell decides to accelerate development of the system and incorporate satellite transmission links, both of which could be expected to lower costs and increase flexibility. Bell Canada currently offers a similar videoconference service between and among four cities in the East (Ottawa, Toronto, Montreal, and Quebec) and two cities in the West (Edmonton and Calgary). The Canadian system already makes use of a domestic satellite for the East-West transmission link. It also offers portable videoconference units which rent for a modest $200 per month, plus local and network charges. Use of a studio at the telephone company goes for $25 per hour plus network charges.[12]

b. Specialized Common Carrier Systems

In 1971, the Federal Communications Commission decided to permit specialized carriers to provide communication services in competition with common carriers like AT&T. Specialized carriers provide dedicated private line services on an interstate basis which are tailored to the particular requirements of specific users (rather than the general public). In 1972, the FCC's Domestic Satellite Decision permitted private sector firms to establish domestic satellite systems.

Satellite Business Systems (a joint partnership involving IBM, COMSAT, and Aetna) is an example of a specialized common carrier. SBS has firm plans for providing videoconferencing (along with voice, high-speed facsimile, and especially data communications) service using two high power satellites

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[12]Bill Doucette, "Conferencing in Canada," Educational & Industrial Television, Vol. 9, No. 8 (August 1977), pp. 30-31.

in the 12-14 GHz frequency spectrum (Ku-band). The SBS system will have the potential to use small earth stations.

But as Philip N. Whittaker, SBS President, has clearly stated, "From its inception, SBS had in mind a rather specific customer set. This is the big corporations, the large governmental agencies, and certain industry-wide aggregated consumers of communications services. We do not intend to offer services to the home or to the corner grocery store."[13]

The SBS system is geared to private network needs and is most suitable for large corporations. SBS satellite time alone (without the entire system) will be relatively expensive compared to common carrier time, because SBS satellites are geared to be used most cost-effectively as part of large resource-sharing communications networks.

However, Congress may prefer SBS satellites because they permit the use of small, mobile earth stations, and on that basis might be able to justify the higher rate. Eventually, in the long run, Congress might be able to make use of SBS networks leased by various federal agencies or as part of the Federal Telecommunications System. And Ku-band satellite systems are on the drawing boards of other specialized common carriers as well as some existing domestic satellite carriers (like Western Union). There is still the possibility that they--along perhaps even with SBS--will give a higher priority in the future to meeting the videoconferencing needs of public service users, including the Congress.

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[13]Philip N. Whittaker, "The Specialized Common Carrier Industry and Satellite Business Systems (SBA)," remarks before the Electronic Industries Association 1977 Seminar on "Telecommunications--Trends and Directions," June 1, 1977.

c. Public Broadcasting System

The United States is fortunate to have a relatively well-developed public television system. With proper interconnection, the public TV facilities could serve as videoconferencing studios for a wide range of non-broadcast as well as broadcast uses, including congressional applications. At this very moment, the Corporation for Public Broadcasting is establishing a satellite interconnection system using Western Union's Westar domestic satellite which operates in the C-band (4-6 GHz). Five of the 150 earth station terminals will have two-way video (transmit/receive) capability, in addition to the main origination terminal in the Washington, D.C. metropolitan area.

This system will be adequate to meet CPB's current programming distribution needs. It will also permit expanded coverage of, for example, congressional committee hearings in Washington, D.C., with distribution on a live or videotaped basis to Public TV stations in geographic sections of the country with a particular interest in the hearing agenda. But it will not be adequate for interactive video applications such as regional or state-wide electronic town meetings, field testimony for hearings in state legislatures or the Congress (like the Stevenson demonstration), or congressional-constituent videoconferences (a la Rose and McCloskey). This critique holds true for other public service applications requiring two-way video as well, whether educational, health, social and community service, or the like.

Some expansion in the two-way video capability is possible, however. Western Union and CPB have a shared-use agreement where each can use the other's earth stations. This means that videoconferences could be held

between Washington, D.C., and about a dozen other major metropolitan areas (e.g., New York, Dallas, Chicago, Seattle/Portland, San Francisco/Los Angeles, Columbia, S.C., Hartford, Conn., Denver, Co., and Lincoln, Neb.). In addition, Western Union may consider adding video transmit capability to some Public TV stations currently planning for video receive only. Finally, Western Union is committed to two "advanced Westar" satellites in the Ku-band which will permit the use of small earth stations for two-way as well as one-way video. Perhaps the Public TV earth stations can be modified to include Ku-band video transmit capability, once the "advanced Westar" satellites become available, a move which would significantly increase the system's potential for videoconferencing via satellite.

d. Domestic Satellite Common Carrier

Several domestic satellite common carriers (e.g., Western Union, Fairchild's American Satellite Corp., RCA American Communications, Inc.) are now operating in the 4-6 Gigahertz frequency range (C-band).

As a basis for comparison, current Westar rates for point-to-point full-duplex (two-way video) service between any two major U.S. cities are $230/hour before 12 noon Eastern time, $480/hour between 12 noon and 4 p.m., and $1,080/hour after 4 p.m. Rates are drastically higher in the evening hours due to network broadcast TV traffic.

[For heavy users (e.g., 10 hours a day, 7 days a week), RCA Americom rates for off-peak hours (2 a.m.-5 p.m. weekdays, 3 a.m.-12 noon weekends) are $175/hour/transponder or $350/hour for a full duplex (two-way video) channel. RCA is proposing a business tariff (Monday-Friday use only) of about $150/hour/transponder ($300/hour for full duplex), which will go into

effect in the near future. Thus RCA and Western Union rates are at least in the same ballpark.]

The customer must also provide for the TV studio at each end of the conference and arrange for an interconnect between the Westar earth stations (more accurately, between the WU "TV Operating Center" or TOC located downtown in major cities, which in turn is connected by WU to the earth stations) and the customer's TV studios. The interconnect may be by permanent microwave or a leased line from AT&T, but does represent an additional cost which varies on a case-by-case basis. If an AT&T interconnect is required, the cost can be substantial (on the order of $500/day, $1,500/week, or $24K/year for a ten mile link).

As explained earlier, the next generation of satellites (like the "advanced Westar" or the CTS used in the congressional videoconferencing demonstrations), will lower the cost of earth stations to the $50,000 range and perhaps less, and will permit the location of earth stations on the customer's premises, thus eliminating the need for an expensive landline interconnect.

Western Union expects to be able to provide such Ku-band satellite service in the early 1980's at prices most likely lower than current C-band tariffs, due to a projected increase in overall traffic volume and to the extended useful life of existing satellites (beyond the seven years originally estimated and currently used for depreciation purposes). However, in all fairness, some experts question the validity of Western Union's market projections for Ku-band service and the strength of WU's commitment to provide such service by the early 1980's. In addition, some observers believe that, despite the success of NASA's CTS Ku-band satellite, further

technological development and user experimentation will be needed before commercial Ku-band satellite service becomes a reality.

e. Advanced Communications Technology Satellite

The current CTS satellite (jointly operated by Canada and the U.S.) does operate in the Ku-band and permits the use of small, low-cost earth station terminals, whether stationary (like the NASA-Lewis facility) or mobile (like the Portable Earth Terminal). CTS has made the congressional videoconferencing demonstrations possible.

Unfortunately, CTS will not last forever. And this first CTS, while representing a significant advance over the ATS-6 and the current generation of commercial domestic satellites, falls significantly short of what is now technically feasible although yet to be developed. In its normal operating mode for videoconferencing, CTS has a capacity of one two-way video channel between two earth stations. This means that, if HEW--or a congressional committee or any other user--is conducting a videoconference between, say, Washington, D.C., and Seattle, Washington, there are severe limitations on any other simultaneous use of the satellite for video purposes. The constraints on scheduling and flexibility are obvious.

Because there are yet-to-be developed technical options (e.g., multibeam satellite, orbital antenna farm) which permit small, low-cost earth terminals and a large number of users at many locations, the National Academy of Science's National Research Council and others have recommended that NASA design and develop an advanced CTS satellite.

A recent review by the NAS/NRC Committee on Satellite Communications (chaired by Wilbur B. Davenport of MIT) found that "a number of potential communications services, such as for health care delivery, educational services, search and rescue, electronic mail, teleconferencing, and

environmental data collection, apparently cannot readily or economically be provided using the technology available to the common carriers for producing conventional telephone and television services." Further, "the current NASA satellite communications program is inadequate, both in terms of meeting NASA's statutory advisory obligations and in terms of meeting the country's needs in satellite communications research and development." The Committee recommended that NASA support experimental programs to develop and flight-test "new public service satellite communications systems."[14]

Many of the current CTS experimenters (including several federal agencies and major universities) support a second generation CTS for the reasons cited above and also, and quite importantly, because an advanced CTS would provide continued technological leadership and direction to the specialized and common carriers, and to the public TV system, in their own quest to provide the United States with the most cost-effective communications system possible. While an advanced CTS will not meet congressional needs for an operational system, it would facilitate continued experimentation on congressional applications.

A decision to proceed with an advanced CTS would amount to getting NASA back into satellite communications R&D, and would in effect reverse the Nixon Administration's 1973 judgment that NASA was no longer needed in this area. The communications satellite has been a significant spin-off or public dividend of the Space program. NASA has provided technological leadership which has been critical to the development of the private sector domestic satellite industry and to important public sector applications.

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[14] National Research Council, Assembly of Engineering, Committee on Satellite Communications, Federal Research and Development for Satellite Communications, 1977.

f. "Gapsat" or Syncom IV

In order to fill the gap between the expected end of the useful life of the CTS and ATS-6 satellites in 1980 or before, and the development of an operational satellite service which can meet public service needs, a "gapsat" has been proposed. The leading candidate for a gapsat is the Hughes Syncom IV satellite.

Hughes Aircraft Co. has reached tentative agreement with NASA to launch Syncom IV in 1980 as a test payload on the Space Shuttle, with PSSC (the Public Service Satellite Consortium) responsible for definition and financing of a satellite payload to meet the needs of public service users. Because PSSC must arrange financing on the order of several million dollars, and because many of the users would be federal government agencies and/or federally funded satellite experiments, several agencies have been asked to pick up a substantial portion of the payload cost. An inter-agency agreement is being negotiated.

g. Public Service Communications Satellite ("Pubsat")

The Syncom IV "gapsat" is one form of public service communications satellite. Another would be a public service satellite system owned and operated by the private sector, built with private financing, but with a government guaranteed market and/or government guaranteed loans. Other options include a satellite system owned and operated by the private sector with government financing, or a system owned, operated, and financed entirely by the government. All of these options assume that the private sector does not now and will not be able to meet in the future legitimate public service needs for satellite communication.

E. BENEFIT-COST ANALYSIS OF CONGRESSIONAL VIDEOCONFERENCING

Whatever the benefits of congressional videoconferencing may be, in terms of saving time and energy, reaching more people more effectively, increasing citizen participation and feedback, etc., they have to be weighed against the financial costs of using the system. The actual cost will depend largely on the type of operational system which evolves in the U.S. As discussed earlier, the most likely--and perhaps only--way that the Congress will have access to satellite videoconferencing on a regular basis will be through an operational system developed for commercial and/or public service use.

1. Estimated User Costs for an Operational System (1980-1982 time frame)

To be useful to the Congress as well as other public sector users, a satellite videoconferencing system might include the following:

- Small, low-cost earth fixed earth stations/TV studios suitable for public service use, e.g., one per congressional district for a total of 435.
- Small, low-cost mobile earth stations/TV studios suitable for public service use, e.g., one per State, total of 50.
- Low-cost satellite transmission via full duplex (two-way video) Ku-band transponders on public service and/or commercial satellites expected to be operational in the 1980-1982 time frame.
- House/Senate interconnect and origination capability.

The fixed (permanent) and mobile earth stations/TV studios could be owned and operated by universities, hospitals, local/state/federal government agencies, and the like. Or the earth stations (and perhaps the TV studios too) could be leased from public service and/or commercial vendors.

Stations/studios for public service users could be financed with government guaranteed loans and/or government grants to universities, libraries, hospitals, etc., but in any case the costs could be recovered through pro-rated user fees. Financing could be provided either through new legislation (e.g., a Public Service Communications Act of 1978) and/or consolidation and strengthening of existing support mechanisms now dispersed among several federal agencies (e.g., NASA, NEW, VA). All public service stations/studios could be conveniently located and made available for use by the public on a non-discriminatory basis. The Congress would only be one user among many, and would account for only a very small percentage of total use.

The satellite transmission link would be obtained by the users from public service and/or commercial Ku-band satellite operators. The assumption here is that the Congress could make use of at least one pair of transponders on an 8 hours a day, 5 days a week basis, and thus justify a yearly lease to obtain the lowest possible hourly cost.

With respect to the House/Senate interconnect and origination capability, fortunately much of the necessary capability already exists or is being planned as part of the communications support for routine House and Senate operations. (See earlier discussion.) However, a one-time investment of about $200,000 would be required if the Congress wanted to install its own earth station, including additional studio capacity, with an annual operating cost of about $70,000 plus $30,000 for depreciation. On a 40-hour week basis, the pro-rated operating cost would be about $50/hour.

Thus the cost to Congress for satellite videoconferencing will include the satellite transmission charge (e.g., $200/hour/duplex channel), the

operating cost of the congressional earth station ($50/hour), plus the pro-rated fee for use of the earth station/TV studio in the district or state.

The latter cost can be estimated as follows:

- Fixed TV studio at $50K (includes 1 or 2 color cameras, zoom lens, switcher if necessary, monitors, videotape recorder, lighting and related electronics), located in an existing building of a university, government agency, library, or other public place, thus eliminating building acquisition (or rental) and most maintenance costs.

- Fixed earth station at $50K (based on volume production, 1977 small volume cost is about $150K), includes antenna uplink/downlink and transmitter/receiver, located in/on existing structure as above.

- Government guaranteed loan, $100K for earth station and TV studio, repayable over 10 years at 9 percent interest ($15,204/year interest and principal or $1,267/month).

- Annual operating costs at $70K (includes 1 producer/director/technician, 1 or 2 camera/equipment operators, electric power, telephone, expendable supplies like videotape and lights) plus $15K depreciation (calculated on a 7 year basis) for a total of $ 85K/year.

- Total annual operating costs of approximately $100K ($70K operations + $15K principal and interest + $15K depreciation).

- Assuming the studio operates 8 hours a day, 261 days a year (52 weeks), for a total of 2088 hours/year, the pro-rated user fee would be about $50/hour. (Of course, if the studio operated only 20 hours a week on the average, the pro-rated fee would increase to $100/hour; if the studio operated 80 hours a week, the fee would drop to about $25/hour.)

NOTE: All cost estimates are based on best available data for volume production of earth stations and TV studios at today's prices and technology, assume average use of all earth stations/TV studios (40 hours per week), and assume a modest 15% decline in satellite transmission rates by 1980-1982. Because technology advances will, if anything, further reduce the cost of earth stations and TV studios, because average use might well exceed 40 hours per week (and thus reduce per hour operating costs), and because market and technology factors may combine to reduce satellite transmission tariffs, the cost estimates presented here are likely to be on the high side.

2. Estimated Costs of Typical Congressional Videoconferencing Applications

With the foregoing assumptions and caveats, the basic estimated cost for congressional videoconferencing in the 1980-1982 time frame would be $300/hour for simple applications with one field location. The $300/hour includes $200/hour for the basic two-way video link (which requires two satellite transponders), $50/hour for use of the congressional earth station in Washington, D.C., and $50/hour for use of the earth station/TV studio at a single field location. Each additional location would require use of an extra satellite transponder (at $100/hour), plus the use of an additional earth station/TV studio (at $50/hour). Under present commercial rate structures, satellite transmission time in the evening is almost prohibitive in cost. If demand for evening time is strong, the Congress could consider leasing a duplex channel (two transponders) on a full time basis, which would reduce the cost somewhat.

Within this framework, the cost to Congress for typical congressional videoconferencing applications would be as follows (see Figure Five, Summary Report):

- Congressional subcommittee hearing with remote testimony via satellite from four witnesses at one field location, e.g., Denver, for two hours (9:30-11:30 a.m.), total cost of $300/hour ($200 + $50 + $50) or $600 for the two hour hearing.

- Full congressional committee hearing with remote testimony via satellite from panels of witnesses (four persons per panel) at three field locations, e.g., San Francisco, Denver, Boston, for three hours (9 a.m.-12 noon), total cost of $600/hour (the basic $200 + $50 + $50 plus $100 for two additional earth stations/TV studios plus $200 for two extra transponders required) or $1800 for the three hour hearing.

- Congressional staff oversight/investigative meeting via satellite with citizens (ten individuals) at one field location using a mobile earth station/TV studio in, e.g., Raton, New Mexico,

for two hours (10 a.m.-12 noon), total cost of $300/hour ($200 for satellite time + $50 for congressional earth station/TV studio use + $50 for mobile earth station/TV studio use), or $600 for the two hour meeting.

- Congressional "town meeting" via satellite with citizens (group of 150 people, questions and answers with 15) at one location, e.g., Corvallis, Oregon, using mobile earth station/TV studio for one hour (11 a.m.-12 noon), total cost of $300/hour.

3. Benefit-Cost Comparisons (See Figure Six, Summary Report.)

Using best available cost data, the benefit/cost ratio for the four sample applications would be calculated in the following manner:

- Congressional subcommittee hearing: cost $600. Benefits include air fare savings of $1144 (4 x $286 Denver-Washington roundtrip), witness air travel time savings of $240 (4 x 6 hours roundtrip by air x $10/hour), witness per diem savings of $200 (4 x $50 per diem), local travel to Denver airport or Denver satellite studio is assumed to be equivalent, for a total direct savings of $1584 or a benefit/cost ratio of about 2.5:1. This of course does not include the presumed benefits of broadening public participation, avoiding the hassle of travel, and the like, which have subjective values.

- Full congressional committee hearing: cost $1800. Benefits include air fare savings of $3216 (4 x $400 San Francisco-Washington roundtrip, 4 x $286 Denver-Washington, 4 x $118 Boston-Washington), witness air travel time savings of $720 (4 x 10 hours San Francisco roundtrip x $10/hour, 4 x 6 hours Denver roundtrip, 4 x 2 hours Boston roundtrip), witness per diem savings of $600 (12 x $50 per diem), for a total direct savings of $4536 or a benefit/cost ratio of about 2.5:1.

- Congressional staff oversight/investigative meeting: cost $600. The benefit/cost ratio in this case could be based on ten individuals traveling to Washington or, say, two congressional staff persons traveling to Raton, New Mexico.

  Assuming the latter, which is most likely, benefits include air fare savings of $572 (2 x $286 Washington-Albuquerque, N.M., roundtrip), staff persons air travel time savings of $240 (2 x 8 hours one-stop air roundtrip x $15/hour), staff local travel time savings of $300 (2 x 10 hours auto roundtrip Albuquerque-Raton x $15/hour), staff local travel fare savings of $94 (360 miles roundtrip at $0.15/mile = $54 + $20/day x 2 days for rental car), staff per diem savings of $200 (2 x 2 days x $50/day), for a total direct savings of $1406 or a benefit/cost ratio of about 2.5:1. This represents a net saving of $ 806 in taxpayer money.

- Congressional "town meeting": cost $300.
  The benefit/cost ratio here could be based on 150 citizens traveling to Washington, which is extremely unlikely, or the congressman traveling to Corvallis, Oregon.
  Assuming the latter, the benefits include air fare savings of $450 (1 x $400 roundtrip Washington-Portland + $50 Portland-Corvallis), congressman's air travel time savings of $420 (1 x 14 hours one-stop air roundtrip x $30/hour), congressman's per diem savings of $50, for a total direct savings of $920 (net savings of $620) or a benefit/cost ratio of about 3:1.

Realistically, most congressmen from distant states would not participate in town meetings except on regularly scheduled trips to the district. And many public witnesses would not have the time or money to fly to Washington, D.C. to testify. So if because of satellite videoconferencing, members of Congress are able to participate in town meetings during the week (which is usually impossible when Congress is in session) or exchange views with public witnesses in distant cities and towns, we are talking about constituent communication which would not otherwise occur. The subjective value to the congressmen and particularly the constituents may be far in excess of the dollar savings figure.

Indeed, all benefit/cost ratios limited (as these have) to factors which can be expressed in dollars will probably understate the benefit side which, in this case, should include the subjective value of reaching more people more effectively, increasing citizen feedback and participation, minimizing the disruption and fatigue caused by travel, and the like.

F. CONCLUSIONS AND RECOMMENDATIONS

1. In Conclusion: Opening Congress to the People; A Comment by Sen. Lee Metcalf

Many of the congressmen participating in this (1977) study and in an earlier (1973-1974) interview survey have expressed the need for video-conferencing and other emergent telecommunication channels to help them meet their public responsibilities. Faced with increased complexity in social problems and the volume and diversity of citizen demands, video-conferencing can help the Congress do a better job representing the people and legislating on their behalf.

From the perspective of the public participants in the 1977 experiment, videoconferencing can open up new possibilities for learning about the Congress, for acquiring more relevant information about (and participating in) the legislative process and specific issues, and for communicating views and opinions to Congress on a more timely and informed basis.

The full significance of videoconferencing and related technologies for opening Congress to the people has perhaps been best summarized by the late Senator Lee Metcalf:[15]

"The Senate Subcommittee on Science, Technology and Space, sitting in Washington, D.C., on June 8, 1977, conducted a legislative hearing with witnesses hundreds of miles away. Made possible by satellite communications technology, this experimental use of television marks an historic "first" of great significance for the future, not just for the Congress but for the entire nation.

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[15] Lee Metcalf, "Historic Experiment Brings Witnesses to Senate Hearing Via Communications Satellite," Congressional Record, June 10, 1977, pp. S-9410-9411.

"Its importance lies, of course, in the potential for taking Congress to the people, permitting a closer relationship between citizens in all walks of life and those of us who represent them here.

"Through the application of this technology, it will be possible to hear directly from the average citizen--the working man and housewife who are ordinarily unable to afford a trip to the Capitol--on legislative questions of interest to them. So-called 'field' hearings, now being held only occasionally, can become a common practice, easily arranged, allowing local residents to engage in a 'face-to-face' dialogue with Senators and Representatives through a two-way video and audio hookup.

"For too many years the Federal government has been seen to be remote, unresponsive, insulated and untrustworthy. All of us sense the feeling of distrust whenever we are able to return to our home States, visits which have become more and more infrequent over the years as congressional sessions have steadily lengthened and the workload has continued to expand.

"In these circumstances, there are compelling reasons for us to be looking for new ways of relating the work of the Congress to the people, for bringing more citizens into our hearings as participants, for listening to voices other than those of the professional witnesses we tend to hear year after year in the development of legislation.

"Ultimately, if we can realize the potential of this technology and gain routine access to such communications facilities, the Congress and individual Senators and Representatives could schedule 'town meetings' with groups of constituents on a reasonably frequent basis.

"Three years ago the Joint Committee on Congressional Operations conducted extensive hearings on Congress and this institution's use of mass communications. Our studies at that time clearly indicated the need for vastly improving the availability of information about Government--about issues as well as how our constitutional system functions. And they also pointed up the potential of communication satellites for transmission of congressional hearings--and floor debates--directly to those areas of the country most interested in or affected by a given legislative issue. Satellite technology can be used to direct public service broadcasts to local stations, allowing live or delayed telecasting of hearings or debates in any State or region which may be primarily affected by a particular bill or committee investigation.

"I believe these experimental demonstrations of congressional video-conferencing opens the prospect for a new era in representative democracy. I hope all Senators and Representatives and the public at large will consider the implications of this important experiment and encourage further exploration of methods of improving the exchange of information and ideas between the U.S. Congress and the American people whom it serves."

2. What Should the Congress Do Now to Ensure An Operational Videoconferencing System by 1980-1982?

Congress must act now, in order to ensure that operational satellite systems of the early 1980s will meet public and congressional needs for videoconferencing.

Recognizing the urgency and priority of the issues at stake, the Congress in concert with the President should:

- Require that U.S. preparation for the 1979 WARC (the World Administrative Radio Conference, which allocates frequencies for satellite and other use) give full consideration to public service needs and take no action or position which would foreclose public service videoconferencing options.

- Request that the U.S. Office of Technology Assessment and the U.S. Department of Commerce (Assistant Secretary for Telecommunications and Information) conduct, for the Congress and the President respectively, a comprehensive policy and technology assessment of public service satellite communications.

- The assessments should consider the following satellite videoconferencing options:

  -- Bell System videoconferencing service
  -- Specialized common carriers
  -- Public Broadcasting System with public service videoconferencing capability
  -- Domestic satellite common carriers (including a hybrid C-Ku band satellite option)
  -- Advanced NASA-CTS satellite for Ku-band multi-beam public service experiments
  -- Public service communications satellite (including the Syncom IV "gapsat")

- With the results of these assessments before them, the Science and Technology and Communications Subcommittees of the House and Senate should conduct full hearings on the future of public service satellite communications.

- The Congress and the White House Domestic Policy Staff and Office of Science and Technology Policy should consider the need for amendments to the Communications Act of 1934 and other public laws, new legislation, and/or administrative or regulatory actions to protect the public interest in satellite communications.

3. What Should Congress Do in the Interim?

The Congress can move ahead right now with some applications of satellite technology, even though a fully operational videoconferencing system can not be expected until the early 1980s.

A first step should be to assign overall responsibility for congressional satellite applications to the appropriate committees of Congress, and then to authorize--perhaps by Joint Resolution--a comprehensive demand/cost analysis of videoconferencing and related needs.

- The analysis should include a survey of all committees and congressional support offices, plus a sample of individual members, and could logically be conducted under the direction of the House Administration, House Rules, and Senate Rules and Administration Committee, and the House Select Committee on Congressional Operations.

The following applications are possible right now through the means indicated, some at relatively low cost. (See Figure Seven, Summary Report.)

- Conduct of committee or subcommittee hearings with public witnesses at one or more field locations.
  - -- Use of the NASA CTS system for additional videoconferencing demonstrations (especially for smaller towns and rural areas).
  - -- Use of commercial satellite systems for videoconferencing demonstrations between major metropolitan areas.
  - -- Use of the Public Broadcasting System satellite interconnect system for videoconferencing demonstrations.
- Conduct of committee or subcommittee staff-level meetings and conferences with some participants at a distant location.
  - -- Use of Bell System videoconferencing service between two major cities (e.g., $390/hour for Washington, D.C.-San Francisco).
  - -- Use of commercial computer-conferencing network between multiple locations around the U.S. (e.g., $17/hour plus $25/month for the computer use and $90/month per terminal).
- Conduct of staff-level meetings of congressional support offices, e.g., Congressional Research Service and Office of Technology Assessment, in seeking views of experts and laypersons outside of Washington, D.C. and for presentation of results to congressional staff.
  - -- Use of Bell System videoconferencing, as above.
  - -- Use of commercial computer-conferencing network, as above.
  - -- Use of commercial multipurpose teleconferencing network with voice, data, facsimile, graphics, and perhaps slow-scan video capability.

- Transmission of closed-circuit television coverage of House/Senate floor proceedings to remote locations around the country.
  - -- Use of the Public Broadcasting satellite interconnect system to distribute proceedings to Public TV stations for discretionary programming. (PBS will have 150 earth terminals serving 163 Public TV stations by the end of 1978.)
  - -- Use of commercial satellite systems to distribute proceedings to local cable TV stations for discretionary programming. (Close to 200 cable TV stations have satellite earth terminals installed or under construction.
- Transmission of closed-circuit coverage of committee/subcommittee proceedings to remote locations around the country.
  - -- Use of Public Broadcasting satellite interconnect, as above.
  - -- Use of commercial satellite cable TV interconnect, as above.
- Distribution of legislative information to congressional district and state offices, public schools and libraries, and local/state governments around the country.
  - -- Use of commercial computer-conferencing network, as above.
  - -- Use of commercial multipurpose teleconferencing, as above.

The use of computers merits some elaboration. In the last few years, the Congress had made major strides in the use of computerized information systems to support legislative activities. Quite a few congressmen have computer terminals in their offices, as do several congressional committees. Support offices like the Congressional Research Service make extensive use of computer systems in their research and analytical activities.

Increasing Congressional use of computers has of course reflected and followed the "computer revolution" in the private sector. Many computer-conferencing systems are now available commercially at relatively modest rates. NASA's CTS project has been making use of one such system known

as PLANET. The PLANET systems permits: distribution of information to all participants, private messages between any two participants, hard copy printout of messages for record purposes, and retrieval of stored information.[16] The system allows people who are geographically separated to engage in a variety of conferencing activities, either by agreeing in advance to a particular "meeting" time or by running the PLANET system at their convenience to review each other's comments. The system is accessible through a network which may be reached conveniently anywhere in the continental United States.[17]

Computer conferencing thus offers the potential to interconnect congressional information systems with district and state offices, local schools, public libraries, and the like. In this way, computer conferencing can serve as a means to distribute and exchange information on public issues and legislation as a complement to face-to-face videoconferencing.

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[16]Brad Gibbs, "CTS Planet Involvement," UEB-51, NASA, CTS Program, December 7, 1976.

[17]Jacques Vallee, The Planet System: A User's Guide (Palo Alto, Ca. Infomedia, Inc., 1977).

PART III. SECOND-YEAR POTENTIAL

G. PUBLIC PARTICIPATION IN THE NATIONAL ENERGY PROGRAM: VIDEOCONFERENCING ON RENEWABLE ENERGY

1. Energy: A Complicated Problem with No Simple Solution

The first-year results demonstrated that congressional videoconferencing can be useful for constituent communications and for field testimony before committee or subcommittee hearings. But the full potential of new communication channels such as videoconferencing is in facilitating public dialogue and involvement on political issues which are so complex and difficult that traditional means no longer suffice. The energy issue is a prime example.

Energy is an extremely complex area with implications for just about every aspect of life. It is difficult enough just to understand the energy problem. But on top of that, almost everyone has some kind of interest in what we do--or don't do--about energy. The stakes are enormous, and appeals to the public are multiple and conflicting as various interests vie for public support.

Congressman Charlie Rose summed it up well in these remarks to Raeford, N.C., high school students:

"What you're seeing with the energy crisis is a complicated problem. Now hear me out one minute. The energy crisis does not have a simple solution. You know our world has become so complex in the last several decades that most of the problems that I have up here in Washington don't have a simple solution; they're problems that have long range solutions. And before you're going to solve them, you've got to explain them to the people. And the people have to understand what the alternatives are; they've got to understand what they want for the future.

"There are some people urging us to get back to the days of town meetings, not just to let people come in and holler about what's happening right now, but to talk about what they want the future of Hoke County, or the future of Raeford, or the future of North Carolina to be like. Maybe some of these town meetings could be held via satellite.

"As politicians we can handle simple black and white problems that people understand very easily, like building a school, or building a courthouse, or doing something that people can see and understand. But when it comes to a long range problem like energy where everybody doesn't understand the problem and the options that might be available, we are in a mess. We as politicians can't really do anything except gently lead the people; they've got to be brought along with us and participate in the process."

On issues like energy, new mechanisms are needed for establishing a more effective dialogue between and among citizens and their representatives in government. The traditional means of communicating--e.g., letter, phone call, newspaper article, TV program--can continue to play an important role. But we must look further.

2. Experimental Demonstrations of Videoconferencing on Energy

In the first year of the congressional videoconferencing project, the subject matter discussed was wide-ranging. However, while not planned in advance, energy problems were very much on the minds of both congressional and public participants. As a result, all four of the experimental demonstrations in some way addressed the subject of energy.

Energy-related excerpts from the Rose videoconference with high school students are presented below, followed by portions of a discussion between

Senator Schmitt and several witnesses during the Stevenson subcommittee hearings. Although not reproduced here, Rep. Paul McCloskey took the opportunity before and after his videoconference with psychologists to talk with NASA personnel and his own district staff about the water and energy situation in California.

a. Energy-Related Excerpts from the Rose Videoconference

The videoconference between Congressman Rose and students of Hoke County, N.C., came just five days before President Carter's first address to the Nation on energy. Not surprisingly, Rose chose energy as the subject for his opening remarks to the students. He made several references to the President's energy program, and many of the questions from students dealt with various aspects of the energy crisis and alternative government actions for dealing with energy problems.

Congressman Rose made the point that "when the President wants to speak to the nation, he goes on national television and everybody hears him. You know that Congressman Charlie Rose or Senator Robert Morgan can't just go out and get on national television because the nation is not that interested in what we have to say to you back home in North Carolina." Rose recognized the potential of satellite videoconferencing "to address you back home where you live and talk to you specifically about things that bother you in Hoke County or the 7th Congressional District of North Carolina."

ROSE (in Washington, D.C.): People ask me, how is the American public going to react if the President proposes a get-tough policy to cut down on the use of petroleum. I'd be interested in your response to that.

STUDENT (in Raeford, N.C.): Well, I don't think the people are going to like it. People like to be free, you know, to do whatever they want.

ROSE: Let me ask you a question: if we're going to run out of gasoline in about the year 2040, or 2030, which would you rather do? Had you rather us start trying to cut back now, or just go flat out until you get to the year 2030 and then be completely out? Which do you think is the best way for us to go?

STUDENT: Well, obviously, it's to start cutting back now. Most people will be able to do that, but they aren't going to like it. They're just going to have to learn, I guess, to cut back and think of what they're doing. And I guess if you educate people about the problem, they'll think about it and start cutting back.

ROSE: Thank you. How about the person next to you. Do you have a reaction on the energy thing?

STUDENT: I think that President Carter is trying to do the right thing. But because he's new at the job, maybe he doesn't know exactly what to do. Maybe his advisers aren't telling him exactly what's going on. How much energy do you think is actually expended in Washington that could be cut down in Washington, rather than in Hoke County, North Carolina?

ROSE: Now, what kind of energy are you talking about? There's a lot of hot air up here; is that what you mean?

STUDENT: No. There are people cutting down on the thermostats, and the President is wearing sweaters in the White House. But how many offices in Washington have their thermostats up, for their comfort, and aren't thinking themselves about the conservation effort?

STUDENT: Congressman Rose, what can we as citizens do about increasing utility rates?

ROSE: You know, I get more mail on that subject that any other subject that people write me about. Jimmy Carter's going to say a few

things about this Monday night, but I'll give you some advice right now. You ought to figure a way to put storm windows up and do a better job of insulating your homes. You ought to get some materials on solar energy; I'm sure the library has some. Of if they don't, write me and I'll send you some. Mechanics Illustrated not too long ago had an article on how to build a solar hot water heater. Electrical energy is expensive, and it's not going to get any cheaper.

STUDENT: How is the President's energy program going to affect the average farmer in Hoke County?

ROSE: The President is going to try to discourage some of the uses of propane that are presently being made in agriculture by encouraging the use of solar energy. Now, whether we are going to have solar heated tobacco barns or not, I don't know. But there's a school in Wilmington where the architect designed and built in a place for solar panels. You'll probably see the day pretty shortly when solar panels will be very economical for you all to purchase to put on school buildings, because in the winter time you know how much sunlight we have.

b. Energy-Related Excerpts from the Stevenson Subcommittee Hearing

The June 8, 1977, satellite hearing of the Senate Subcommittee on Science, Technology and Space focused on weather and climate. But even in his opening remarks, subcommittee chairman Adlai E. Stevenson recognized the linkages between climate and many other critical areas, including energy. "The economy, food production, water and energy supplies, the human condition are dependent on climate. The past winter provided a drastic example of how adverse weather conditions influence our lives. The impact of the drought in the West may be more crippling this summer than the freeze last winter."

In the following excerpts, Sen. Harrision Schmitt pursues with several witnesses the complex relationships between energy, the environment, and weather.

SCHMITT (in Washington, D.C.): A final question has to do with the effect and potential effect of energy parks or of concentration of large numbers of power plants. For example, I am sure that in the area around Chicago we will see increasing numbers of large energy parks that not only are giving off waste heat but also considerable additional moisture.

Would you care to comment of that?

DR. CHANGNON (in Springfield, Ill.): Senator, I will try to answer.

One of the interesting effects found in the St. Louis area is that a region of concentrated petroleum refineries, which give off considerable energy and moisture through their cooling systems, is a very prominent local place for the generation of clouds and occasionally a considerable rainfall.

Unfortunately, we don't have large energy parks at this time to specifically say what they will do. However, there may be a considerable amount of cloud modeling, in a computer sense, that can be done to predict the effects of energy parks.

And it's generally thought that the types of energy released from these parks, which are over 20 to 40 square kilometers in area, will be a very distinct generator of clouds and thunderstorms.

SCHMITT: Do you see the pollution that is introduced in an urban area by power plants or otherwise as providing nuclei for the generation of both clouds and precipitation?

DR. CHANGNON: I wish the results at St. Louis were more complete at the time on the causes of the additional storminess and rainfall. But I think the consensus of the scientists involved is that much of the effect is thermodynamic and not related to the release of aerosols that serve as cloud and raindrop nuclei.

The man-made microphysical changes do not seem to be as important in producing the weather changes in the St. Louis area as do the just general roughness, heat of the site, and the effect on the air flow.

SENATOR SCHMITT: Dr. Suomi may recall some of the pictures that were taken from orbit that showed extensive--or at least an increase in--snowfall downwind from a power plant. Not just downwind, but for several hundred miles, as I recall, downwind.

Would you care to comment on that, Dr. Suomi?

DR. SUOMI: I would, thank you very much.

What is interesting in this question which you have raised is the possibility of feedbacks. For example, while a certain amount of energy is released into the atmosphere by power plants, it's conceivable that the clouds they generate--if they do, in fact, generate them--would modulate the solar energy to a much greater extent than energy released by a power plant itself.

So over a state like Illinois or Wisconsin, the change in cloudiness from day to day would greatly swamp any particular small amount of energy that might be released. But it is the indirect effect--the feedback mechanisms, as we call them--which are so important. For example, if this study is correct, then as the albedo is increased, say, because grass dries up, this would tend to cause rainfall, which would keep the grass from getting green again. So we have a positive feedback.

3. Discussion Format and Subject-Matter for Videoconferencing on Energy

The first-year results demonstrated that videoconferencing can facilitate dialogue on energy between congressmen and a broad spectrum of the public, from high school students to local public officials to university professors to subject matter experts.

However, in these demonstrations, there was no common format for discussion, and the specific aspect of energy under discussion varied widely. A common format and subject matter are two elements that would be necessary for videoconferencing on energy to be effective on a larger scale.

a. Discussion Format

Regardless of the specific subject matter chosen, a major objective of videoconferencing on energy should be to help organize the discussion and background information within a useful format or framework which is relevant to the energy policymaking process. The simplest format along these lines was suggested by Congressman Charlie Rose: "Most of the problems that I face up here in Washington don't have a simple solution; they're problems that have long range solutions. And before you're going to solve them you've got to explain them to the people. And the people have to understand what the alternatives are; they've got to understand what they want for the future. . . You've got to help us decide what you want the future to be like, and you've got to understand how much it's going to cost, what the alternatives are, and whether you're willing to pay the price."

Problem-alternatives-impacts: a simple format would have at least these three components. Much of the uncertainty or disagreement over energy information in the public mind comes from lack of even such a basic discussion framework as this. Even among energy "experts," lack of a

common frame of reference makes it very difficult to arrive at shared perceptions about energy problems. There is more energy information around --in the newspapers, research reports, newsletters, TV specials, etc.--than most people can or care to assimilate. The major problem in this area is not more information but a better framework or format for understanding the information we already have.

A good framework can deal with the complexities of the energy situation in a comprehensive and systemic way yet at the same time be understandable to all interested parties, from the average citizen to the policy makers. It can help focus discussion on the most essential questions. It can help lay the groundwork for attacking the energy problem in new ways, e.g., from a systemic perspective which can account for the interconnections and inter-dependencies between various aspects of the energy situation and the trade-offs--implicit and explicit--associated with legislative and administrative options.

Such a "discussion format" or "assessment framework" has been developed and tested at The George Washington University Program of Policy Studies in Science and Technology, drawing on experience in a wide range of energy-related studies over the last five years, and could be used extensively for videoconferencing on energy.

A common discussion format for use in videoconferencing on energy should also help facilitate the involvement of stakeholders (e.g., manufacturers, vendors, state/local government, customers) through their direct participation. Stakeholders can have a basis for involvement as suppliers and users in the energy cycle, participants in the process of energy innovation (for technology, systems, and institutions), and parties who are affected or impacted by changes in the energy cycle or by energy innovation.

b. Subject Matter for Videoconferencing on Energy

Energy is a broad area. The conservation, use, and development of energy cuts across almost every aspect of American society. Many other problems areas are closely interrelated (e.g., weather, climate, land use, food, water, environment, materials, transportation). And many government agencies are involved.

To be useful and manageable, videoconferencing on energy will have to focus on particular aspects of the energy agenda. The following examples have been selected because they are politically important areas where the policy issues are complicated by a lack of shared perceptions and uncertainty or disagreement over energy-related information as well as by value differences. In addition, all of these areas are of continuing interest to both the U.S. Congress and the Carter Administration.

- Public attitudes on alternative nuclear fuel cycles. The priority placed by President Carter and the Congressional leadership on nuclear non-proliferation has stimulated a new Department of Energy (DOE) effort to examine nuclear fuel cycle alternatives to plutonium-based breeder and light water reactor options. The major concern is that nuclear fuel and/or waste products associated with these options is weapons-grade or can be converted to weapons-grade materials with relative ease. As a consequence, DOE has initiated a comprehensive assessment of the potential of alternative fuel cycles for reducing nuclear proliferation.

  Congressional action on alternative fuel cycles will ultimately require both the synthesis of a vast amount of information about fuel cycles (from DOE and elsewhere) into some understandable form and the determination of public attitudes about these fuel cycles.

  Videoconferencing could be used by the relevant congressional committees to convene groups of the general public and various stakeholder representatives at distant locations to ascertain their attitudes on the fuel cycle options.

- Barriers and incentives to solar heating and cooling. The President and many members of Congress have called for a major effort to install solar energy in American homes and buildings. Accordingly, DOE has initiated a serious effort to identify barriers and incentives to solar heating and cooling. While the emphasis is on solar energy systems for the home, attention is also being given to industrial and agricultural applications.

In order accurately to assess the perceptions and attitudes of solar energy participants (e.g., landowners, realtors, taxing authorities, engineers) as a basis for congressional action, the appropriate committees of Congress could conduct a series of group discussion meetings focusing on barriers and incentives to solar heating and cooling. Videoconferencing appears to be well-suited to this purpose.

- Public understanding of energy conservation. The President and Congress have also made a major commitment to energy conservation. Here the disagreement is less over what should be done than over whether the American public will actually take the energy crisis seriously and participate in "voluntary" conservation activities.

  Some observers have suggested that a "bottom up" approach to public understanding be adopted to complement the traditional "top down" approach taken by the political leadership. Videoconferencing could be used to help focus public discussion at the local and regional levels in a more constructive manner than is currently the case.

  A specific example might be the use of videoconferencing for field hearings on the impact of the energy program on older Americans and how they might participate in conservation measures. Energy is related to the health and welfare of older persons both directly, in the sense that energy keeps their homes and apartments warm, and indirectly, in that energy makes possible the transportation for "meals on wheels," "community senior centers," and other critical services. Senior citizens spend a greater relative share of their monthly income on energy and thus are more vulnerable.

  Videoconferencing would be particularly appropriate in the case of senior citizens to facilitate participation of those who clearly could not fly to Washington, D.C.

H. VIDEOCONFERENCING ON RENEWABLE ENERGY

Renewable energy is a very appropriate energy subject for congressional videoconferencing. Renewable energy is a politically important area with substantial interest on the part of the general public. Grassroots activity is widespread. But despite the apparent commitment of the President and many members of Congress, there is wide disagreement in and out of the government over the extent to which renewable energy is a viable short term option.

Using renewable energy as a theme, a series of videoconferences could be scheduled to explore the potential of specific options like:

- Low-technology small-scale windmills.
- On-site solar heating and cooling systems.
- Low-tower intermediate-scale solar thermal electric plants.
- Biomass conversion systems (using agricultural residues, urban wastes, or energy crops) to produce solar power and methanol.

The discussion could be geared to how these options can help solve the energy crisis, what the barriers and incentives to their implementation appear to be, and where these options might impact the economy, employment, environment, health and safety, nuclear non-proliferation, and the like.

1. Distribution of Legislative Information Package on Renewable Energy to Public Libraries and Schools

All of the videoconferences should use the same information base and problem-options-impacts format so that the discussions will build on each other and make a greater cumulative contribution to the energy policymaking process.

The videoconferences could be preceded by the distribution of relevant background information on renewable energy to potential participants. The Congressional Research Service could take the lead in putting together a legislative package on renewable energy. Likewise, the Congressional Office of Technology Assessment could take the lead in developing a discussion format suitable for public dialogue on renewable energy. These items would then be reproduced and distributed through the mail or perhaps via computer-conferencing to public libraries and schools--as well as potential individual participants--in geographic areas where videoconferences are to be scheduled.

Some participants may of course have their own independent sources of information, and they would be encouraged to enter their own material into the common information base in advance of the videoconferences. Again, distribution of this information would be through the mail or by computer-conferencing. So in effect, in this scenario, the videoconferences would be preceded by a computer conference among some or all of the potential participants to establish a common pool of information and a common discussion format. CRS and OTA, on behalf of the Congress, would have an initial input, as would the relevant congressional staff persons. But the computer-conferencing process would be completely open to inputs from all of the public participants.

Commercial computer-conferencing service is available at modest prices (e.g., $17/hour plus $25/month for use of the computer). A terminal leases for about $90/month from Bell/AT&T. CRS and OTA and many congressional offices already have terminals. And a growing number of public libraries and schools also have terminals, as do many universities and research

organizations. So many of the potential participants hopefully would have access to an already existing computer terminal in order to minimize the cost of the conference.

2. Conduct of Congressional Committee or Subcommittee Staff-Level Meetings with Public Participants at Distant Locations

At this point, the appropriate congressional staff persons could conduct preliminary discussions with some or all of the public participants. The purpose of the preliminary meetings would be to make sure the full range of options is considered and that all responsible viewpoints are represented.

Staff-level meetings could conceivably be held in a full videoconference mode using the NASA-Communications Technology Satellite system, or perhaps here the Bell System videoconferencing service would be appropriate. Of course the Bell service is limited to four cities: New York, Chicago, San Francsico, and Washington, D.C. And the NASA-CTS system is limited to Greenbelt, Md., Cleveland, the San Francisco Bay area, and Washington, D.C., unless the Portable Earth Terminal and/or facilities of other experimenters are utilized.

Use of computer-conferencing would significantly broaden the geographic scope of activity at a rather modest cost, but would sacrifice the two-way video dimension. This could perhaps be partially offset through use of a multipurpose computer-conferencing network with voice, data, facsimile, graphics, and perhaps slow-scan video capability.

3. Conduct of Comittee or Subcommittee Hearings/Meetings with Testimony from Public Witnesses Via Satellite

If the Communications Technology Satellite is used for congressional hearings or meetings on renewable energy, greater geographic flexibility can be built into the system through more effective use of the Portable Earth Terminal (PET) and through cooperation with other experiments which have satellite terminals/studios in areas or regions of the country which are not served by NASA ground facilities.

With respect to PET, it might be possible for one or more congressional subcommittee to hold a series of hearings or meetings with congressmen at the NASA-HQ studio in Washington, D.C. and public witnesses at the PET in various cities and towns already scheduled by other experimenters. The congressional use would in effect piggyback on the already scheduled PET activities.

For example, during the last six months of 1977, PET was in Birmingham, Alabama; Boise and Pocatello, Idaho; Missoula, Great Falls, and Billings, Montana; Atlanta, Georgia; Hershey, Pennsylvania; and Wasatch, Utah. During 1978, PET will continue to move around the country.

The House Small Business Subcommittee on Energy Problems, chaired by Rep. Alvin Baldus, could use the PET to expand its field hearings on the role of small business in solar energy. The Subcommittee members recognize that small businessmen rarely get to Washington, D.C. to express their views and may be left out in the cold when it comes to energy policymaking. Hearings were held in February at three field locations: Madison, Wisconsin; Minneapolis, Minnesota; and San Diego, California. Satellite videoconferencing could help expand the reach of the Subcommittee hearings and significantly

increase the involvement of small business in congressional deliberations on renewable energy. Videoconferencing also could assist the Subcommittee in oversight of Department of Energy activities which relate to small business.

With respect to satellite terminals/studios in areas of the country not served by NASA, cooperation with other experiments can extend the reach of the CTS satellite communication system.

- For example, the CTS system developed by the U.S. Public Health Service includes earth stations in Seattle, Washington; Denver, Colorado; and Lexington, Kentucky. This opens up the possibility of videoconferences with the participation of several key members of the Senate Energy and Natural Resources Committee, including Sen. Henry Jackson of Washington state, the full committee chairman, and Sen. Floyd K. Haskell of Colorado and Sen. Wendell H. Ford of Kentucky, chairman and vice chairman of the Subcommittee on Energy Production and Supply.

- If the Portable Earth Terminal is scheduled for use in, say, Idaho, then by piggybacking on the existing schedule, the participation of Sen. Frank Church of Idaho, chairman of the Senate Energy Subcommittee on Energy Research and Development, becomes a real possibility. On the House side, two members of the Ad Hoc Select Committee on Energy are from the state of Washington, Rep. Jim Foley (chairman of the House Agriculture Committee) and Rep. Mike McCormack (chairman of the House Science and Technology Subcommittee on Advanced Energy Research and Development).

- As another example, the CTS system developed by the Archdiocese of San Francisco (known as Project Interchange) includes a studio in Menlo Park, California, with microwave interconnect to local cable and educational TV stations throughout the San Francisco Bay Area, and with satellite relay to cable and educational TV in other parts of California.

- With the Project Interchange system, a Bay Area-wide regional "town meeting" could be planned around the subject of, for example, renewable energy alternatives for Northern California and the potential use of tidal, wind, geothermal, solar, and biomass energy sources. Participation could include Rep. Leo J. Ryan, chairman of the House Government Operations Subcommittee on Environment, Energy and Natural Resources, and Rep. John L. Burton, his subcommittee colleague, both of whom are from the San Francisco Bay Area.

4. Transmission of Congressional Committee Hearings to Distant Locations Around the Country

Satellite technology can also facilitate teleconferencing or closed-circuit TV coverage of congressional hearings. For example, based on the results of videoconferences conducted by Congressman Baldus on the role of small business in solar energy, the full House Committee on Small Business may wish to hold hearings on proposed legislation. In this case, the committee may wish to have the witnesses themselves appear in person in Washington, D.C. But the Committee may also desire to give small businessmen in other parts of the country an opportunity to watch the hearings and perhaps call in their questions by telephone.

A communications satellite could be used to transmit the hearings to cable and public TV stations around the country. These stations could in turn decide whether to run the hearings live, on a tape-delayed basis, or tape excerpts for use in news programs. For example, close to 200 cable TV stations have satellite earth terminals installed or under construction. And the Public Broadcasting System will have a satellite interconnect network with 150 earth stations serving 163 Public TV stations by the end of 1978. Thus a commercial satellite could be leased by the congressional committee for one-way video distribution of the hearings to the cable TV and public TV satellite interconnect networks. The cost of the satellite itself would be modest. TV origination equipment in Washington, D.C. could be provided by the House Recording Studio or perhaps by PBS. Indeed, PBS may be willing to pick up the entire cost once their system is operational, if the hearing is of sufficient public affairs value.

On a more limited basis, the Communications Technology Satellite system could be used to distribute the hearings to locations around the country served by CTS ground stations. Since only one-way video and not two-way video would be required, the number of locations capable of receiving the TV signal would be much larger than with straight videoconferencing.

For example, the Southern Educational Television Association has video-receive CTS terminals in ten Southern cities, including Columbia, South Carolina; Jackson, Mississippi; Austin, Texas; Norfolk, Virginia; Birmingham, Alabama; and Atlanta, Georgia. And the Veterans Administration has installed 32 video-receive terminals at VA hospitals throughout the Western states. Locations include Grand Junction, Colorado; Cheyenne and Sheridan, Wyoming; Albuquerque, New Mexico; Phoenix and Tuscon, Arizona; Salt Lake City, Utah; Boise, Idaho; Portland and Roseburg, Oregon; Reno, Nevada; and several locations in Washington state and California. Only two regions of the country do not have any permanent CTS facilities, the Midwest and Northeast, and they could be served by PET at least on a limited basis.

In practice, the CTS system could offer up to perhaps 40 or 50 video-receive locations for TV coverage of a congressional hearing. There are actually 89 CTS terminals, but not all could be used at one time.[18] While this is a relatively small potential distribution compared to the 150 public TV and 200 cable TV video-receive locations now under development, the CTS system is operational now and may be quite suitable on a demonstration basis for various congressional applications. And indeed, many hearings may

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[18]Patrick L. Donoughe and Henry R. Hunczak, CTS-Hermes: United States Experiments and Operations Summary, TM-73830, NASA-Lewis Research Center, November 29, 1977.

be of a major interest to only a relatively few locations around the country, and thus a large distribution network would not be called for.

The point is that, regardless of which particular satellite system is used, transmission of TV coverage of congressional committee hearings to distant locations around the country is possible right now and offers an important complement to congressional videoconferencing.

5. Videoconferencing: An Energy-Conserving and Democratic Technology, Comments by President Jimmy Carter and Senator Adlai E. Stevenson

In sum, the second-year potential of this project suggests that satellite videoconferencing should be used by the Congress to facilitiate broad public participation--experts and laypersons alike--in key aspects of the national energy program. Use of videoconferencing will help to open up the dialogue to people who do not have the time or money to travel to Washington, D.C., and will also help conserve the time and energy of the congressmen themselves. Thus new communication channels like video-conferencing are both democratic, by virtue of their two-way participative nature, as well as energy-conserving in their own right.

To quote from Jimmy Carter during the 1976 Presidential campaign:[19]

> "One important part of a comprehensive energy conservation program is the effective use of telecommunications technology. . . New ways of using telecommunications--such as telephones linked to computers or video conferencing via satellite--bring the promise of substantial time, money, and energy savings. . . The technology is here today. What we need are the institutional mechanisms and commitment in both the public and private sectors to make best use of our assets."

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[19]Jimmy Carter, answer to question No. 8, Engineering Societies Questionnaire on "Ford and Carter Speak Out on Technology," printed in the IEEE Spectrum, October 1976, p. 104.

And in the words of Sen. Adlai E. Stevenson, two days after his Subcommittee on Science, Technology and Space successfully conducted a legislative hearing via satellite:[20]

> "We are approaching the time when Congress and other public groups will have routine access to communications facilities that will permit a much closer relationship between citizens and their legislative representatives in Congress. It will be realistic, for example, for Congress to conduct hearings in all parts of the world without leaving the Capital or requiring witnesses to travel to the Capital. . .
>
> "I can report that the satellite experiment last Wednesday was successful. The subcommittee received testimony on climate and weather from three panels of witnesses. We were able to question the witnesses without difficulty. A useful hearing record was compiled on this important subject. . .
>
> "Mr. President, Congress has needlessly lagged behind in adopting its procedures and facilities to the existing communications technology. As our experiment on Wednesday demonstrated, there will soon be additional opportunities for increasing public involvement in the work of Congress through the application of public service communications. We should be ready to use this technology in an open and responsible manner."

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[20]Adlai E. Stevenson, "Subcommittee on Science, Technology and Space Conducts Legislative Hearing by CTS Satellite," Congressional Record, June 10, 1977, pp. S-9407-9409.